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# REVISION OF THE NEARCTIC SPECIES OF PHOTINUS *(LAMPYRIDAE: COLEOPTERA)*

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The present revision is the first attempt to segregate and define the Nearctic species of *Photinus* since the publication of LeConte's *Synopsis of the Lampyridae* in 1881. Subsequently six species were described as new by Fall and Olivier, and other new ones have accumulated in collections, more than doubling the total number known to LeConte. It has been found that several of the published names must be reduced to synonymy. The classification of the Nearctic species herein proposed provides a phylogenetic arrangement that may readily be amplified for the inclusion of Neotropical forms.

Except in the male genitalia, structural diversity of a definite nature is completely lacking for many of the species. Differences in body form, sculpture, and color pattern are noted, but all are more or less subject to variation. In color the Nearctic species conform closely to a general plan. This will be described now and need not be repeated in the species descriptions, where only pertinent modifications will be noted. The head, antennae, and elytra are dark rufous or brown, varying to nearly black; with the sutural, lateral, and apical borders of the elytra narrowly pale flavate or fulvous. The pronotum is pale flavate or fulvous with a central dark spot. The ventral surface, except anteriorly, and the legs, except at base, are rufous or brown, varying to nearly black, with the luminous areas of the abdomen pale testaceous. Color characters of taxonomic value are found

in the formation of the pronotal dark spot, the color of the scutellum and adjoining mesonotal areas, the width of the lateral pale border of the elytra, and the color of the pygidium and of ventral segment 5. In one of the species the elytra are entirely black.

The first abdominal segment in adult Lampyridae is dorsal only, the first visible ventral segment belonging to the second segment of the abdomen. In numbering the ventral segments, therefore, the numbers will always be one greater than the actual count of the visible ventral segments. The sternites occupy only the median half, more or less, of each ventral segment except the terminal. The lateral part, on each side, represents the pleurite, which at its outer margin is narrowly inflexed and becomes dorsal. This small dorsal part bears the spiracle in *Photinus,* and in most of the other lampyrid genera. In the Pleotomi and Lamprocerae, however, the spiracle is located in the ventral portion of the pleurite near its outer margin. The suture between pleurite and sternite is plainly evident in the larval stage, but in the adult this suture is obliterated and indicated only by a vague longitudinal depression. In view of the above, it would be incorrect to refer to the ventral segments of the abdomen as sternites.

The Nearctic species of *Photinus* separate into two primary divisions, each characterized by a distinctive type of male genitalia. The first division forms a homogeneous taxonomic unit that in all probability should be accorded generic rank. The genitalia are greatly diversified in these species, which are otherwise so similar in appearance that they have heretofore been mostly overlooked. In the species of Division II the median lobe of the aedeagus is provided with two sclerotized ventro-basal processes projecting outwardly, one on each side, more or less over the lateral lobes. These processes are lacking in the species of Division I. In Division II the genitalia serve to define a number of species groups, but are for the most part of little value for specific determinations within each group because of a close similarity and a very evident degree of structural plasticity.

In certain lampyrid genera, e.g. *Phausis* and *Cratomorphus,* the distal abdominal tergites are produced at the sides over the dorsal part of their pleurites and are widely visible from a ventral viewpoint. In such a case the abdomen was said to be lobed or foliate by earlier authors. Foliation is completely lacking in the *Photinus* species of Division I. Incipient foliation occurs in all of the species of the *P. punctulatus, P. consanguineus,* and *P. ardens* groups of Division II, where tergites 6 and 7 are narrowly visible at the sides from below. The *pyralis* group of Division II occupies an intermediate position, with the first two species as in Division I, and the last species approaching the structure found in the groups following.

The epipleurae of *Photinus* are quite wide at the base of the elytra, embracing the sides of the body. The inner epipleural margin rapidly

approaches the external margin to form a triangular basal part, extending posteriorly to about the basal seventh of the elytral length. The inner epipleural margin thence continues as a more or less distinct raised line on the underside of the elytra, obsolescing without reaching the apex. Slight variations of this pattern occur according to species. A rather feebly distinct but recognizable type characterizes all of the species of Division I: the wide basal part is less abruptly narrowed posteriorly and merges gradually into the narrow distal part, the latter is wider and with a better defined inner margin that is more nearly in the same plane as the exterior margin, so that the epipleurae may be described as subhorizontal.

Collectors are especially urged to look for the females of those species of *Photinus* in which that sex is flightless. Very few of these are at present in collections, while two of the Nearctic species believed to have brachypterous females are still known only by the male. The author has frequently taken the flightless females of *Photinus scintillans* in the early evening, just before dark, by looking in the grass and low herbage over which the males are flying. The presence of a female is indicated by a feeble flash emitted as the male is approaching, after having alighted nearby. The flightless females, such as have been examined, are not apterous by have rudimentary wings under their very short elytra.

Mr. H. S. Barber found the flashing habits of *Photuris* to be distinctive for many of the species and useful in their identification. It is probable that the same is true of *Photinus*. Barber and F. A. McDermott have recorded flash data with the specimens they collected, but very little other information on the subject is available. In some of the species observed, such as *P. scintillans* and *P. marginellus,* and probably also for many others, the males in flight produce single short flashes. Both single and double flashes have been noted for *P. consanguineus* in apparently identical specimens collected at the same time and place. Males of the *P. ardens* group are recognizable in flight by a multiple flash of from four to seven short illuminations in quick succession. The flash of *P. pyralis* is characteristic. It always occurs as the insect is slowly rising in a vertical direction after an inclined descending flight. The flash does not end abruptly but is followed by a short and dim afterglow.

The generic synonymy, as it stands in the literature, has been omitted from this discussion. It is in need of verification by a study of type species that are not now available. Probably some at least of the published synonyms should be restored as valid genera. This will be particularly desirable when the very large number of still undescribed species shall have been made known. The presence of luminous areas and the dissimilarity of the sexes are not necessarily characters of generic importance, as they have heretofore been considered.

The material on which this revision was based came from many sources

in addition to the extensive collections of the California Academy of Sciences. The author wishes to express his sincere thanks and appreciation to the following for the loan or gift of specimens over a period of years, or for otherwise cooperating in this study: Agricultural and Mechanical College of Texas, L. S. Dillon and H. J. Reinhard; American Museum of Natural History, Mont A. Cazier; University of Arkansas, L. H. Rolston; University of California, Paul D. Hurd; University of California at Los Angeles, J. N. Belkin; Carnegie Museum, George Wallace; Chicago Natural History Museum, Henry Dybas; Cornell University, Henry Dietrich; University of Delaware, Chas. Triplehorn; Emory University, the late P. W. Fattig; Entomological Laboratory at Augusta, Maine, A. E. Brower; University of Florida, Lewis Berner; Florida State Plant Board, H. V. Weems, Jr.; Illinois Natural History Survey, M. W. Sanderson; University of Kansas, R. H. Beamer; Kansas State College, George A. Dean and Fred A. Lawson; University of Michigan, T. H. Hubbell; University of Missouri, W. R. Enns; North Carolina Department of Agriculture, D. L. Wray; University of Ohio, W. C. Stehr; Ohio State University, J. N. Knull; Ohio State Museum, E. S. Thomas; Oregon State College; South Dakota State College, H. C. Severin; U. S. National Museum, O. L. Cartwright and Ross H. Arnett, Jr.; Owen Bryant; Carl Cook; P. J. Darlington for the privilege of studying the type material of LeConte and Fall at the Museum of Comparative Zoology; R. R. Dreisbach; K. M. Fender; C. A. Frost; Borys Malkin; M. Y. Marshall; E. J. F. Marx; A. T. McClay; F. A. McDermott; P. J. Spangler; and George Steyskal.

## Genus **Photinus** Castlenau

*Photinus* Castlenau, 1833, Soc. Ent. France, Ann. 2:141
*Photinus* Lacordaire, 1857, Gen. Col., 4:321.

In addition to its general lampyrid structure, the genus *Photinus,* as represented in the Nearctic fauna, is characterized as follows. Body texture soft; form elongate oval, lateral margins subparallel. Head strongly deflexed, when retracted it is completely covered by pronotum; gula semimembranous, greatly abbreviated medially by a forward extension of occipital foramen; eyes large, hemispherical. Antennae simple, slender, compressed, 11-segmented, without minute terminal appendix, similar in the sexes, less than half as long as body, with coarse and somewhat bristling pubescence; second segment short, following segments elongate, subequal to each other in length, gradually more slender distally. Clypeus feebly sclerotized, with membranous basal articulation; labrum elongate triangular, membranous; mandibles acute, arcuate, regularly narrowed from base to apex, excepting the internal basal enlargement. Maxillary palpi short and stout, broader distally, second segment not elongated; terminal

segment of labial palpi triangular or securiform, its apex truncate or rounded.

Pronotum semielliptic, anterior angles obliterated, posterior angles subrectangular, sides and front explanate. Elytra with dual pubescence, minute secondary pubescence usually broadly lacking at base; epipleurae completely defined externally by the acute elytral margin, wide at base, rapidly narrowing to about basal seventh, thence narrowly subparallel, obliterated before reaching elytral apex. Prosternum truncate in front; anterior margin of hypomera not attaining lateral margin of thorax; anterior thoracic spiracles prominent, transverse, subtubulate, overlapping the mesepisterna. Abdominal spiracles dorsal.

Abdomen of male with eight visible ventral segments, the two terminal covered by pygidium; light organs, when present, occupying all of ventral segments 6 and 7, these segments each longer than any preceding segment and each with a pair of stigmatiform pores. Female with seven visible ventral segments; light organs, when present, occupying median third or more of the width of segment 6. Legs short and stout, compressed; tibial spurs small, slender and acute, concealed by the apical setae; terminal segment of tarsi extending for less than half its length beyond lobes of deeply emarginate fourth segment; claws simple.

KEY TO MALES OF NEARCTIC *Photinus*

1. Median lobe of aedeagus without ventro-basal processes. Epipleurae subhorizontal, gradually narrowing from base. Ventral segments 6 and 7 transversely convex, segment 5 with pale apical border (except in *P. cookii*). Females alate, similar to male ..... Division I–2

— Median lobe of aedeagus with two sclerotized ventro-basal processes. Epipleurae more strongly inflexed, rapidly narrowing to about basal seventh....Division II–9

DIVISION I

2. Lateral lobes of aedeagus each with a dorsal branch embracing sides of median lobe ..... 3

— Lateral lobes of aedeagus without dorsal branches ..... 7

3. Median lobe of aedeagus extending notably beyond tips of lateral lobes..... 4

— Median lobe of aedeagus not extending beyond tips of lateral lobes..... 5

4. Pronotum with median dark spot, scutellum and mesonotal areas dark piceous. Aedeagus as in figure 1 ..... (1) *P. texanus* Green, new species

— Pronotum without median dark spot, scutellum and mesonotal areas pale fulvous. Aedeagus as in figure 2 ..... (2) *P. immaculatus* Green, new species

5. Species non-luminous, ventral segments 6 and 7 each subequal in length to segment 5, segments 2 to 5 entirely dark piceous....(3) *P. cookii*, Green, new species

— Species luminous, ventral segments 6 and 7 each distinctly longer than any preceding segment, segment 5 with pale apical border ..... 6

6. Median lobe of aedeagus attenuate distally; lateral lobes arcuately ascending, elongate, their dorsal branches long and slender, nearly meeting above..... ..... (4) *P. marginellus* LeConte

— Median lobe of aedeagus not attenuate distally; lateral lobes stout, not ascending, their dorsal branches short, tips distant above ..... (5) *P. curtatus* Green, new species

7. Median lobe of aedeagus extending well beyond tips of lateral lobes ..... (6) *P. floridanus* Fall

— Median lobe of aedeagus not extending beyond tips of lateral lobes ..... 8

8. Pygidium strongly longitudinally humped or roof-shaped. Lateral lobes of aedeagus strongly sclerotized, irregularly dentate within ..... (7) *P. sabulosus* Green, new species

— Pygidium normal. Lateral lobes of aedeagus weakly sclerotized, not denticulate within, acuminate at tip ..... (8) *P. acuminatus* Green, new species

Division II

9. Ventral segments 6 and 7 transversely convex, segment 5 with pale apical border ..... *P. pyralis* group 12

— Ventral segments 6 and 7 nearly flat, segment 5 entirely dark piceous or black ..... 10

10. Lateral lobes of aedeagus elongate, descending, their inner margins contiguous beneath tip of median lobe. Apex of pygidium rounded ..... 11

— Lateral lobes of aedeagus short and stout, not descending, their inner margins separated throughout, or touching only beyond tip of median lobe. Apex of pygidium broadly truncate. Female alate, similar to male ..... *P. consanguineus* group 22

11. Ventral segment 8 arcuately emarginate, without median apical process. Pronotum with median longitudinal line usually distinctly impressed. Female brachypterous, except in *P. umbratus* (unknown in *P. tenuicinctus* and *P. frosti)* ..... *P. punctulatus* group 14

— Ventral segment 8 not or scarcely emarginate, its apical margin produced in a short median cusp. Pronotum without impressed median longitudinal line. Female alate, similar to male ..... *P. ardens* group 26

*P. pyralis* Group

12. Dorsal surface of median lobe of aedeagus membranous in about distal third. Abdomen with basal segments piceous or partly so. Sexes similar ..... 13

— Dorsal surface of median lobe of aedeagus not as above. Abdomen with basal segments entirely pale. Sexes dissimilar, female brachypterous ..... (11) *P. scintillans* (Say)

13. Mandibles stout. Head nearly flat between eyes, surface smooth, with simple punctulation. Ventral segments 2 to 4 entirely dark piceous. Size larger, form more elongate ..... (9) *P. pyralis* (Linné)

— Mandibles slender. Head concave between eyes, surface roughened with irregular granulose punctulation. Ventral segments 2 to 4 not entirely dark piceous, with poorly defined pale areas. Size smaller, form less elongate ..... (10) *P. australis* Green, new species

*P. punctulatus Group*

14. Form normal, broader as in preceding species. Pronotum usually more narrowly rounded in front, lateral margins diverging posteriorly. Elytra each with lateral and sutural margins parallel from humerus to about apical fifth, round-

ing into apex. Antennae longer and more slender. Epipleurae distinct beyond wide basal part ..... 15

— Form more elongate. Pronotum usually broadly rounded in front, lateral margins subparallel or feebly converging posteriorly. Elytra each tapering posteriorly, lateral and sutural margins feebly converging from humerus to near apex. Antennae shorter and stouter. Epipleurae extremely narrow except at base..... 19

15. Lateral pale border of elytra wider, plainly exceeding width of explanate margin medially. Epipleurae, scutellum, and mesonotal areas pale fulvous..... (12) *P. brimleyi* Green, new species

— Lateral pale border of elytra narrow, not exceeding width of explanate margin. Epipleurae usually fuscous basally ..... 16

16. Pygidium pale, sharply contrasting with preceding dark piceous tergites. Disk of pronotum conspicuously and rather closely punctate..... (13) *P. punctulatus* LeConte

— Pygidium and preceding tergites concolorous, dark piceous ..... 17

17. Lateral pale border of elytra very narrow, limited to outer edge of explanate margin ..... (14) *P. tenuicinctus* Green, new species

— Lateral pale border of elytra occupying entire explanate margin ..... 18

18. Disk of pronotum with coarser simple punctation. Scutellum dark piceous basally, mesonotal areas abruptly pale fulvous. (Female unknown, probably brachypterous)..... (15) *P. frosti* Green, new species

— Disk of pronotum minutely punctulate, punctures often subgranulate, especially at sides. Scutellum and mesonotal areas pale fulvous. Female alate, similar to male ..... (16) *P. umbratus* LeConte

19. Pronotum immaculate or with anterior dark spot. Elytra more elongate, extending to tip of abdomen ..... 20

— Pronotum with central dark spot. Elytra less elongate, usually not reaching abdominal apex ..... 21

20. Elytral margins narrowly fulvous. Pronotum rufous with anterior third dark, the dark color rarely extending posteriorly..... (17) *P. collustrans* LeConte

— Elytra entirely black. Pronotum entirely rufous, or rarely somewhat dusky anteriorly ..... (18) *P. stellaris* Fall

21. Pronotum distinctly granulate-punctate ..... (19) *P. granulatus* Fall

— Pronotal punctation not granulate ..... (20) *P. dimissus* LeConte

*P. consanguineus* Group

22. Aedeagus as in figure 16. Habitat southern Arizona..... (21) *P. knulli* Green, new species

— Aedeagus similar to Figure 17. Habitat eastern and mid-western states..... 23

23. Species non-luminous; ventral segments 6 and 7 each subequal in length to segment 5; abdomen entirely black, or irregularly paler apically. Eyes small..... (22) *P. indictus* (LeConte)

— Species luminous; ventral segments 6 and 7 entirely pale, each longer than segment 5. Eyes large ..... 24

24. Pygidium pale, sharply contrasting with preceding dark piceous tergites. Form narrowly elongate. Epipleurae obsolete except at base ..... (23) *P. lineellus* LeConte

— Pygidium and preceding tergites concolorous. Form and epipleurae normal.... 25

25. Form more elongate in male, female shorter. Elytra usually brown or dilute; lateral pale border, when distinctly defined, confined to narrowly explanate margin. Pronotal maculation variable, rarely lacking, usually a more or less distinct broad median vitta. Scutellum usually pale at tip ..... (24) *P. ignitus* Fall

— Form broader and less elongate in both sexes. Elytra dark piceous; lateral pale border well defined, exceeding width of explanate margin medially. Pronotum with broad median dark vitta. Scutellum and mesonotal areas dark piceous..... ..... (25) *P. consanguineus* LeConte

*P. ardens* Group

26. Lateral pale border of elytra wider, exceeding width of explanate margin medially. Pronotum longer, usually more narrowly rounded at middle of front margin; lateral margins arcuate, usually feebly converging at hind angles..... ..... (26) *P. consimilis* Green, new species

— Lateral pale border of elytra narrow throughout, confined to explanate margin. Pronotum shorter, usually evenly and broadly rounded in front; lateral margins subparallel or feebly diverging to hind angles ..... 27

27. Pronotum with slightly narrower median dark vitta, its lateral margins regular and well defined; pale area each side clear fulvous. Form broader ..... ..... (27) *P. carolinus* Green, new species

— Pronotum with broader median dark vitta, its lateral margins somewhat irregular; pale area each side discolored by nubilous brownish or piceous spots, sometimes completely obscured. Form more elongate..... (28) *P. ardens* LeConte

In figure 19 diagrams are presented showing the average body form of three well known species, *P. pyralis, P. consanguineus,* and *P. collustrans.* Reference is made to these diagrams in the species descriptions, as an attempt to convey some idea of the usual body outline. All the species are quite variable in this respect, so that measurement of the length-width ratios would be of little or no value.

In the descriptions that follow, only records confirmed by the author are listed under the distribution captions. For the new species all the specimens studied are included, but only recently examined males are indicated as paratypes. For the previously described species, when represented by very numerous records covering a large territory, only about five are listed from any one state. The present location of the specimens cited is given in parenthesis, abbreviated as shown in the following list:

AMNH — American Museum of Natural History
A & M. Tex — Agricultural and Mechanical College of Texas
ANSP — Academy of Natural Sciences of Philadelphia
CAS — California Academy of Sciences
CM — Carnegie Museum
CNHM — Chicago Natural History Museum
CU — Cornell University
Em. U — Emory University
EL. Aug — Entomological Laboratory at Augusta, Maine
FSPB — Florida State Plant Board

INHS — Illinois Natural History Survey
KSC — Kansas State College
MCZ — Museum of Comparative Zoology
NCDA — North Carolina Department of Agriculture
OSC — Oregon State College
OSM — Ohio State Museum
OSU — Ohio State University
SDSC — South Dakota State College
U.Ark — University of Arkansas
U.Cal — University of California
UCLA—University of California at Los Angeles
U.Del — University of Delaware
U.Fla — University of Florida
U.Kans—University of Kansas
U.Mich — University of Michigan
U.Mo — University of Missouri
UO — University of Ohio
USNM — United States National Museum
Dreisbach — R. R. Dreisbach
Frost — C. A. Frost
Malkin — Borys Malkin
McClay — A. T. McClay

### (1) **Photinus texanus** Green, new species

HOLOTYPE. MALE; Brownsville, Texas, October, 1942, collector unknown. In collection of California Academy of Sciences.

Form as in *P. marginellus*. Pronotum with median dark vitta attaining base but not apex, widest in front, narrowest just before base, at middle nearly one-third as wide as convex surface; anterior coarsely punctate area dusky medially. Scutellum and mesonotal areas dark piceous. Elytra dark brownish piceous, sutural bead flavate nearly to scutellum, lateral pale border wider, exceeding width of explanate margin medially, narrowly continuous around apex. Ventral segments 2 to 4 dark piceous, 5 piceous with apical border pale, 6 to 9 pale, the last faintly dusky; pygidium dark piceous.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate. Epipleurae as in *P. marginellus*. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 1. Length 6.25 mm.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Ventral surface of abdomen dark piceous, segment 5 with apical border narrowly pale medially, segment 6 pale, luminous in median third or more of width, each side sometimes dusky.

VARIATIONS. The pronotal vitta may be uniformly wide throughout its length, or it may be reduced to a triangular spot, widest in front and

not quite attaining base. The pale apical border of male ventral segment 5 may be more extensive, extending nearly to base medially. Length 5–7 mm.

DISTRIBUTION. Texas. *Brownsville:* holotype and 1 paratype, X–42 (CAS); 1 paratype, VI–5–32, J. O. Martin (CAS); 2 females, V–9–08 (U.Mo); 1 female, V–8–35, D. J. & J. N. Knull (OSU); 1 paratype, VIII–8–37, D. J. & J. N. Knull (OSU); 2 paratypes, one dated V–11–38, C. H. T. Townsend (USNM); 1 paratype, VII, Wickham (USNM). *Cameron County:* 1 paratype, 1 female, IV–4–50, D. J. & J. N. Knull (OSU). *Columbus:* 1 female, Wickham (USNM). *Devils River:* 1 male, V–2–07, Bishop & Pratt (USNM). *Gillespie County:* 1 paratype, VI–11–49, D. J. & J. N. Knull (OSU), *Jackson County:* 1 female, V–22–39, D. J. & J. N. Knull (OSU). *San Juan:* 1 paratype, VI–28–38, L. W. Hepner (U.Kans). *Uvalde:* 1 paratype, VI–15–30, J. O. Martin (CAS). *Victoria:* 1 paratype, IV–16, E. A. Schwarz (USNM). No definite locality: 2 females, coll. C. V. Riley (USNM); 1 paratype, Otto Lugger (CNHM). Coahuila, Mexico: 1 paratype, Rancho la Golondrina, Rio Sabinas, *Muzquiz,* VI–28–38, Rollin H. Baker (A &M.Tex.).

This species closely resembles *P. marginellus,* from which it may be distinguished with certainty only by the male genitalia. It is probable that the two species do not occur in the same region. There are no records of *P. marginellus* from Texas, except one example rather dubiously labeled "Texas" only.

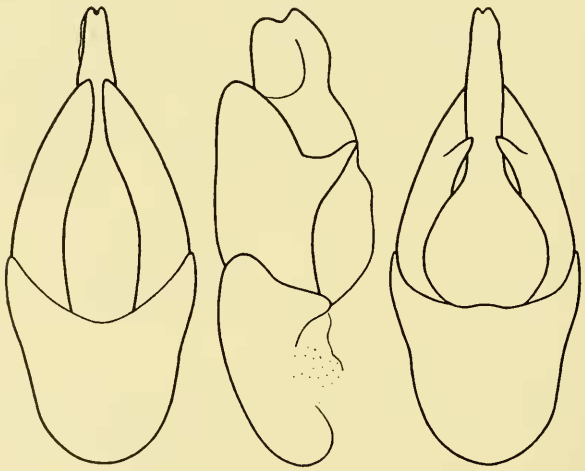

Fig. 1. *Photinus texanus* Green, new species. Paratype; Brownsville, Texas, X-42, E. S. Ross (CAS). Male genitalia: ventral, lateral, and dorsal views, arranged in that order from left to right.

(2) **Photinus immaculatus** Green, new species

HOLOTYPE. MALE; Gillespie County, Texas, VI–23–40, D. J. & J. N. Knull. In collection of Ohio State University.

Form as in *P. marginellus*. Pronotum without median dark spot. Scutellum and mesonotal areas fulvous. Elytra dark piceous brown, sutural bead distinctly flavate in apical half only, lateral pale border wider, confined to explanate margin, narrowly continuous around apex. Ventral segments 2 to 4 dark piceous, 5 to 9 pale; pygidium dark.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate. Epipleurae as in *P. marginellus*. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 2, narrowly inflexed edges of tips of lateral lobes piceous, sparsely denticulate. Length 6.25 mm.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Ventral surface of abdomen dark piceous, segment 5 with apical border broadly pale except at sides, segment 6 pale, luminous in median third or more of width, each side somewhat dusky basally.

VARIATIONS. Nothing of importance noted. Length 6–7.75 mm.

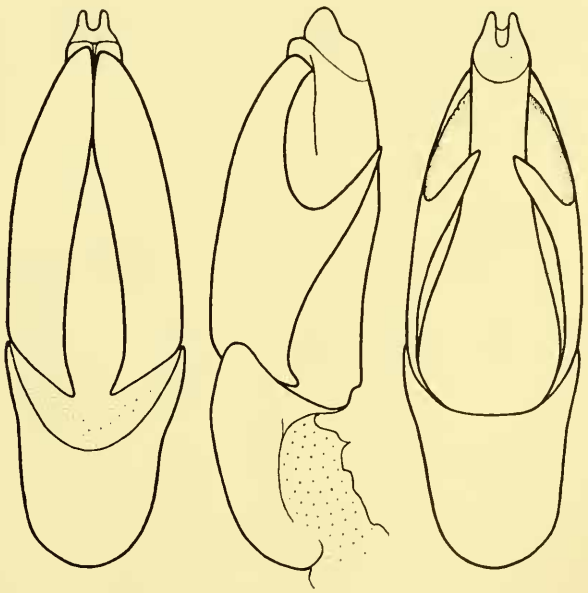

Fig. 2. *Photinus immaculatus* Green, new species. Holotype; Gillespie County, Texas, VI–23–40, D. J. & J. N. Knull (OSU). Male genitalia: ventral, lateral, and dorsal views, arranged in that order from left to right.

DISTRIBUTION. TEXAS. *Gillespie County:* VI–23–40, D. J. & J. N. Knull, holotype, 1 paratype, 3 females (OSU).

It is probable that this species may be distinguished from all other members of Division I by its immaculate pronotum, pale scutellum and mesonotal areas, and normally pigmented elytra. The male genitalia are distinctive, and should be depended upon for identification.

### (3) **Photinus cookii** Green, new species

HOLOTYPE. MALE; Crailhope, Kentucky, VII–11–46, Carl Cook. In collection of California Academy of Sciences.

Form as in *P. marginellus*. Pronotum with median dark vitta attaining base and apex, of nearly uniform width throughout, about one-third as wide as base of pronotum. Scutellum and mesonotal areas dark piceous. Elytra piceous black, sutural bead flavate nearly to scutellum, lateral pale border wider, confined to explanate margin, narrowly continuous around apex. Ventral segments 2 to 5 piceous black, 6 to 9 flavate, basal and lateral borders of 6 and lateral borders of 7 piceous, the dark colors indefinitely limited; pygidium dark.

Eyes comparatively small, separated medially above by more than diameter of eye. Disk of pronotum finely and sparsely punctulate. Epipleurae as in *P. marginellus*. Ventral segment 6 subequal in length to 5, 7 slightly longer; light organs not evident. Aedeagus as in figure 3, distal part of lateral lobes and tips of dorsal branches dark piceous. Length 6.75 mm.

FEMALE. Alate, similar to male. Eyes slightly smaller. Ventral sur-

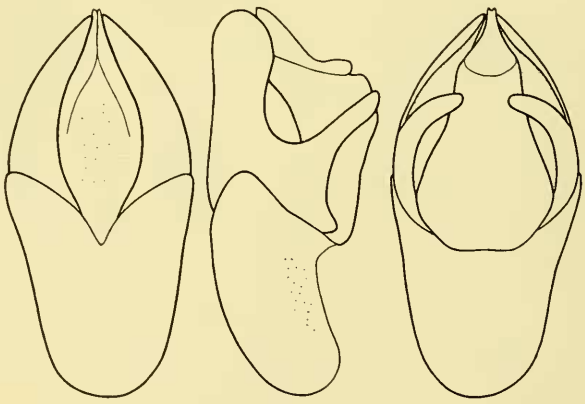

Fig. 3. *Photinus cookii* Green, new species. Paratype; Crailhope, Kentucky, VII–11–46, Carl Cook (CAS). Male genitalia: ventral, lateral, and dorsal views, arranged in that order from left to right.

face of abdomen entirely dark piceous, segments 6 and 8 sometimes with pale maculation.

VARIATIONS. In the male ventral segment 6 varies from largely pale with an indefinite dusky spot at middle of basal border, to entirely black; ventral segment 7 varies from entirely pale to largely dusky with apical border testaceous. In the female the abdomen beneath may be entirely black, or the terminal segment may be partially pale, and segment 6 may be more or less pale medially in the usual position of the luminous area of the female. In both sexes the limits of the dark areas are indefinite or nubilous. The sutural bead of the elytra is sometimes not distinctly flavate, and may be scarcely paler than the adjacent surface. Length 5.25–7.75 mm.

DISTRIBUTION. Kentucky. *Crailhope:* holotype, 14 paratypes, 19 females, VII–1 to 13–1946, Carl Cook (CAS); 3 females, VII–23–47, Carl Cook (CAS); 1 paratype, VII–11–46, Carl Cook (Frost). Tennessee. *Great Smoky Mountains National Park:* 1 male, Cades Cove, VIII–12, R. R. Dreisbach (Dreisbach). North Carolina. *Raleigh:* 3 paratypes, VI–28–35, VII–2–29, VII–7–32, C. S. Brimley (CAS); 1 male, VI–23 (UO). Florida. *Okeechobee:* 1 female, IV–1–37, J. C. Bradley (CU). Illinois. *Elizabethtown:* 2 paratypes, VI–25–32, Ross, Dozier, & Park (INHS). Missouri. *St. Louis:* 1 female, VII–17–90, W. M. Gordon (CU). *Arnold:* 1 female, 1 paratype, VIII–23, D. J. & J. N. Knull (OSU). *Roaring River State Park:* 1 paratype, 1 female, VI–15–54, J. W. Green (CAS) Texas. *Karnack:* 1 paratype, V–22–51, D. J. & J. N. Knull (OSU). *Bay City:* 1 paratype, 7 females, V–4–53, R. H. Beamer (U.Kans).

This species is named in honor of Carl Cook, who collected a large series at Crailhope, Kentucky, and writes concerning it: "Most of the specimens were taken in the daytime by sweeping grasses and shrubs along small streams. A few, however, were collected while flying at night. None of the examples of this species that I have taken were flashing." This information, together with the reduction in the size of the eyes and of abdominal segments 6 and 7, indicates rather conclusively that *P. cookii* is non-luminous. In certain specimens the texture of the pale areas of ventral segments 6 and 7 suggests that the ability to flash has not been completely eliminated. This species is readily distinguished from all others of Division I by the absence of a pale apical border in ventral segment 5.

### (4) **Photinus marginellus** LeConte

*Photinus marginellus* LeConte, 1851, Acad. Nat. Sci. Philadelphia, Proc. (2), 5:335.
*Photinus castus* LeConte, same as above. (restored synonymy)

MALE. Color variable, normally pronotum with median dark spot widest in front, not attaining base or apex, sometimes diffusely entering anterior coarsely punctate area. Scutellum dusky, paler at tip, mesonotal

areas more or less dusky. Elytra brownish piceous, sutural bead flavate to scutellum, lateral pale border wider, exceeding width of explanate margin medially, rather broadly continuous around apex. Ventral segments 2 to 4 piceous brown, 5 pale with basal border sometimes irregularly maculate, 6 to 9 pale; pygidium pale. Color of dorsal surface varying through progressive stages of dilution to entirely dingy whitish testaceous.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate. Epipleurae subhorizontal, gradually narrowing from base. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 4, pale fulvous, tips of lateral lobes usually darker.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Ventral segments 2 to 5 piceous brown, 5 with irregular pale apical border, 6 luminous in median third or more of width, 6 to 8 pale, usually with pale brownish maculation.

LENGTH. Both sexes, 6.5–9 mm.

DISTRIBUTION. NEW HAMPSHIRE. *Durham:* VIII–24, VIII–4 (INHS). *Hampton:* VII–20 (EL.Aug). MASSACHUSETTS. *Woods Hole:* VII–18 (CU). *Framingham:* VI–21 to VIII–9 (Frost). *N. Egremont:* VI, VIII (U.Cal). *Monterey:* VI–30 (Frost). *Southboro:* VI–3 (Frost). CONNECTICUT. *Cornwall:* VI–24, VII–13 (Frost). *Litchfield:* VIII–23 (AMNH). STAMFORD: VIII–1 (AMNH). *Lakeville:* VII–14 (Malkin). *S. Norwalk:* VII–10 (AMNH). NEW YORK. *Ithaca:* VI–26 to VIII–22 (CU). *Olcott:* VII–17 to VIII–16 (CU). *Lockport:* VII–24 (CU). *Bear Mountain:* VII–4

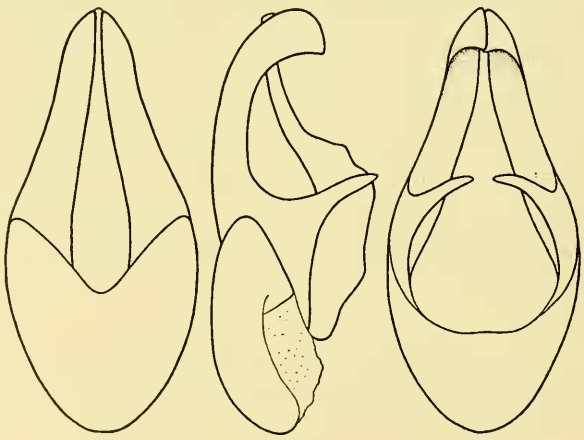

Fig. 4. *Photinus marginellus* LeConte. Easton, Pennsylvania, VI–24–34, J. W. Green (CAS). Male genitalia: ventral, lateral, and dorsal views, arranged in that order from left to right.

to 28 (AMNH). *N. Fairhaven:* VII–1 (CU). Pennsylvania. *Easton:* VI–22 to VII–26, J. W. Green (CAS). *Mt. Pocono:* VII–14, J. W. Green (CAS). *Wyomissing:* VI–19 (McClay). *State College:* VII–23 (Frost). *Pittsburgh:* VI–26 to VII–3 (CAS). New Jersey. *Linwood:* VII–17, J. W. Green (CAS). *New Brunswick:* VI–18 (AMNH). *Ramsey:* VI-29 to VII–31 (AMNH). *Alpine:* VII–25 (AMNH). *Mt. Holly:* VII–4 (Marx). Maryland. *Sparrows Point:* VII–5–34, J. W. Green (CAS). *Odenton:* VII–14 (CU). West Virginia. *Sistersville:* VI–19 (CU). OHIO. *Athens:* VI–23 (UO). *Seisto County:* Roosevelt Game Preserve, VII–20 (UO). *Cleveland:* VII–4 (AMNH). *Delaware County:* VII–21 (OSU). Michigan. *Ionia County:* VII–10–40 (Dreisbach). Indiana. *Cedar L.:* VII–17 (INHS). *Albion:* VII–8–35, H. E. Brown. *Ft. Sheridan:* VIII–30 (Frost). Illinois. *Pittsfield:* VI–6, VII–8 (McClay). *Algonquin:* VII–1 to VIII–8 (INHS). *Monticello:* VII–2 (INHS). *Evanston:* VIII–7 (Marx). *Justice:* VII–23 (INHS). Kentucky. *Quicksand:* VI–25 (CU). *Crailhope:* VI–16–49, Carl Cook (CAS). Tennessee. *Johnson City:* VI–12–51, O. Bryant (CAS). North Carolina. *Black Mountain:* VII–4–40, J. W. Green (CAS). *Southern Pines:* VI–6 (USNM); V–30 (NCDA). *Raleigh:* VI-6 to VII–11 (NCDA). *Cherokee:* VI–28 (UO). *L. Toxaway:* VI–22 (AMNH). Alabama. *Mt. Vernon.* Mississippi. Leakesville: V-23 (CU). *Lucedale:* VI-17 (CU). *Hattiesburg:* VI–28 (AMNH). Wisconsin. *Platteville:* VI–26 (UO). *Milwaukee:* VII–30–89 (AMNH). *Winona* to Stockton: VII–6–28, B. Boland (USNM). Missouri. *St. Charles:* IX–20–01, G. W. Bock (U.Mo). Texas. No definite locality (AMNH). Quebec. *Rouville County:* X–7–02 (U.Mo). Ontario. *St. Cath.:* VI–27 to VII–20, S. D. Hicks.

To confirm the identity of this species the genitalia of LeConte's types at the Museum of Comparative Zoology were examined. The very pale form of *P. marginellus,* uniformly dingy whitish testaceous above, was described as *P. castus* by LeConte, who subsequently reduced it to synonymy. In the Leng Catalogue *P. castus* was again accorded specific rank. Because of the very great interspecific diversity occurring in the male genitalia of this division of *Photinus,* it would be illogical to consider *P. castus* and *P. marginellus,* having identical genitalia, as two distinct species. Possibly *P. castus* is entitled to subspecific standing, as it is found in localities where the pigmented form does not occur. This course has not been followed herein because of the completely intergrading color phases connecting the two extremes. A similar condition is noted in the following species, and also in several species of Division II.

### (5) **Photinus curtatus** Green, new species

HOLOTYPE. MALE; Grosse Ile, Wayne County, Michigan, VII–31–50, George Steyskal. In collection of California Academy of Sciences.

Form as in *P. marginellus*. Pronotum with narrowly subtriangular median dark spot, widest in front, scarcely entering anterior coarsely punctate area, narrowing posteriorly, nearly attaining base. Scutellum and mesonotal areas dusky, scutellum paler apically. Elytra brownish piceous, sutural bead flavate to scutellum, lateral pale border wider, exceeding width of explanate margin medially, rather broadly continuous around apex. Ventral segments 2 to 4 piceous brown, 5 pale with basal border irregularly brownish, 6 to 9 pale; pygidium pale.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate. Epipleurae as in *P. marginellus*. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 5, pale flavate. Length 7.25 mm.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Ventral segments 2 to 5 brownish piceous, 5 with irregular pale apical border, 6 luminous in median third or more of width, 6 to 8 pale, more or less brownish baso-laterally.

VARIATIONS. The pronotal dark spot, usually triangular, may be reduced to a small sublinear maculation, or it may be vittiform and only slightly narrowing posteriorly. The color of the elytra varies from a fully pigmented dark brown to a very dilute brownish gray. Length 6–8 mm.

DISTRIBUTION. NEW YORK (extreme western). *Hamburg:* 1 paratype, VI–21–08, M. C. Van Duzee (CAS). *Rapids:* 1 paratype, VII–2–33 (CU). *Woodville:* 2 paratypes, VI–20–38, W. T. M. Forbes (CU). *Lancaster:* 1 paratype, VI–25–46, R. H. Beamer (U.Kans); 2 paratypes, VI–

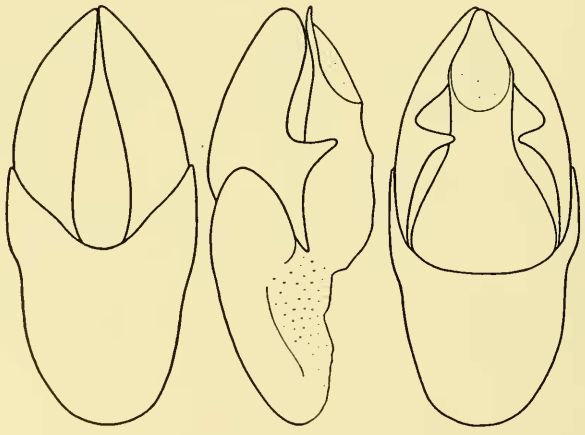

Fig. 5. *Photinus curtatus* Green, new species. Holotype; Gross Ile, Wayne County, Michigan, VII–31–50, Geo. Steyskal (CAS). Male genitalia: ventral, lateral, and dorsal views, arranged in that order from left to right.

28–08, M. C. Van Duzee (CAS); 2 paratypes, M. C. & E. P. Van Duzee (CAS). Ohio. *Columbus:* 2 paratypes, 1 female, VI–27 & 28–51, R. M. Goslin (CAS); large series, VI–27 (OSM). *Delaware County:* 1 paratype, VII–2, D. J. & J. N. Knull (OSU). *Franklin County:* 8 examples, Clinton Township, VII–8 (OSM). Michigan. *Grosse Ile,* Wayne County: holotype, 20 paratypes, 1 female, VII–12 to VIII–1–50, Geo. Steyskal (CAS); 1 paratype, VII–12–50, Geo. Steyskal (Frost). *Detroit:* 1 male, 1 female, VII–20, Summerville. *Oakland County:* 2 paratypes, VII–24–32, A. W. Andrews (CU); 1 male, 1 female, VII–26 (U.Mich). Illinois. *Ft. Sheridan:* 2 paratypes, VIII–12–23, F. Psota (CNHM). *De Kalb County:* 4 paratypes (INHS). *Douville:* 2 paratypes, VII–16–30, Frison & Hottes (INHS). *Putnam County:* 1 paratype, VI–24–32, M. O. Glenn (INHS). *Lilly:* 1 paratype, VI–11–14 (CAS). *Florence:* 1 male, VII–6 (McClay). *Riverside:* 1 male, VII–13 (U.Mich). *Heyworth:* 2 paratypes, VI–24 & 27, Wolcott (USNM). *Peoria:* 3 paratypes, VII–14–23, F. A. McDermott (USNM); 3 paratypes, same data (CAS). *Cairo:* 1 paratype, VII–25, H. S. Barber (USNM). Iowa. *Iowa City,* Wickham: 4 paratypes (U.Mo); 5 paratypes (USNM); 5 paratypes, VII–2 (USNM); 1 paratype, 1 female, VII–21 (USNM); 2 paratypes, VI–25–98 (USNM). *Mt. Pleasant:* 1 paratype, VII–19–28 (USNM). *McGregor:* 1 male, 2 females, VII–15 (U.Mich). No definite locality: 1 male, 1 female (SDSC). South Dakota. *Vermillion:* 2 males, VII–20 & 22 (SDSC). Nebraska. *Malcolm:* 1 paratype, VII–9–09, C. R. Oertel (Frost). *Palmyra:* 1 male, 2 females, VII–3 (McClay). Kansas. *Baldwin:* 1 paratype, 1 female, VI–17–06, J. C. Bridwell (CAS); 1 paratype, VI–7 to 11–06 (CAS); 8 examples, VI–7 to 11–06 (OSC). *Riley County:* 4 paratypes, VII, VII–2, VII–17, Popenoe (USNM); 1 female, VII–10 (CAS); 1 male, VII (KSC). *Topeka:* 2 males, Popenoe (KSC); 2 paratypes, Popenoe, coll. Ashmead (USNM); 1 paratype, Popenoe (CAS). *Leavenworth:* 1 paratype, VII–23–43, M. Y. Marshall (CAS). *Douglas County:* 1 paratype, VI–21–21, Robert Guentert (U.Kans). *Argentine:* 3 paratypes, 1 female, VII–10–06 (U.Mo). Oklahoma. *Major County:* 1 male, VI–26–30, R. D. Bird (CAS).

There are apparently no external characters separating this species from *P. marginellus.* Males are identifiable only by their genitalia, and females by association with the males.

### (6) **Photinus floridanus** Fall

*Photinus floridanus* Fall, 1927, Brooklyn Ent. Soc., Bull., 22:210.

MALE. Form as in *P. marginellus.* Pronotum with median dark vitta usually attaining base but not quite apex, narrowing posteriorly, expanding diffusely in anterior coarsely punctate area. Scutellum and mesonotal areas dark piceous. Elytra dark brownish piceous, sutural bead flavate nearly

to scutellum, lateral pale border wider, somewhat exceeding width of explanate margin medially, narrowly continuous around apex. Ventral segments 2 to 4 pale brownish, 5 to 9 pale; pygidium pale, usually with narrow median brownish vitta broadening basally.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate. Epipleurae as in *P. marginellus*. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 6.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Ventral segments 2 to 4 dark piceous, 5 piceous with pale apical border, 6 pale, luminous in median third or more of width, 7 and 8 pale brownish.

LENGTH. Both sexes, 5.25–6.5 mm.

DISTRIBUTION. FLORIDA. *Gainesville:* Paines Prairie, VII–9 (CU). *Enterprise:* XI–10 (AMNH); V–16, Hubbard & Schwarz (USNM). *Dunedin:* IV–14–16, W. S. Blatchley (CAS); IV– 2 to 14, Mank (CU). *Lake Placid:* Archbold Biol. Station, I–27 (AMNH). *Sanford:* V–4 (AMNH). *Fruitville:* VIII–11–30, R. H. Beamer (U.Kans). *Labelle:* VII–19–48, B. T. McDermott (U.Kans); IV–27 (AMNH). *Crescent City:* IV-22 (AMNH); V-16, Hubbard & Schwarz (USNM). *Lake Okeechobee:* South Bay, V–2 (AMNH). *Paradise Key:* II–22 to III–19 (USNM). *Lake Alfred:* VII–13 & 18, L. Bottimer (USNM). *Biscayne Bay:* (AMNH).

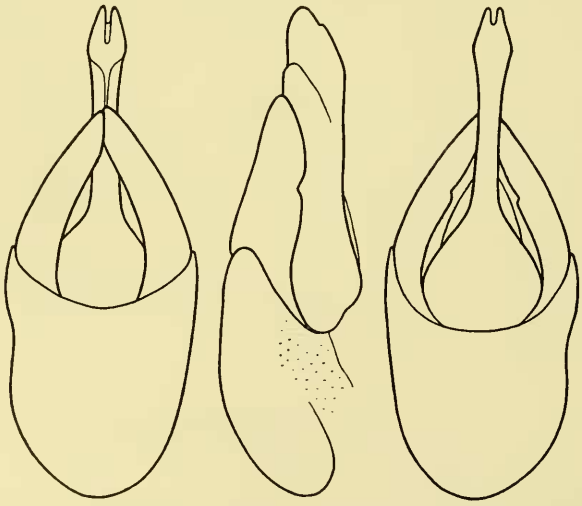

Fig. 6. *Photinus floridanus* Fall. Lake Alfred, Florida, VII–18–28, L. Bottimer, (USNM). Male genitalia: ventral, lateral, and dorsal views, arranged in that order from left to right.

(7) **Photinus sabulosus** Green, new species

HOLOTYPE. MALE; Baltimore, Maryland, VII–21, F. E. Blaisdell. In collection of California Academy of Sciences.

Form as in *P. marginellus*. Pronotum with triangular median dark spot, widest in front where it is about half as wide as convex disk, diffusely entering anterior coarsely punctate area, narrowing posteriorly, nearly attaining base. Scutellum dark piceous, mesonotal areas somewhat paler. Elytra piceous black, sutural bead flavate to scutellum, lateral pale border wider, exceeding width of explanate margin medially, rather broadly continuous around apex. Ventral segments 2 to 4 brownish fuscous, somewhat mottled, 5 to 9 pale; pygidium mahogany brown medially, sides pale.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate. Epipleurae as in *P. marginellus*. Ventral segments 6 and 7 large, entirely luminous. Pygidium densely and irregularly punctate, punctures in part somewhat elongate and open posteriorly; surface strongly longitudinally humped or roof-shaped; apex broadly truncate and bisinuate, produced at middle in a feeble lobe. Aedeagus as in figure 7, lateral lobes densely sclerotized, black except basally. Length 7.5 mm.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Ventral segments piceous brown, 5 largely pale medially, 6 luminous in median third or more of width, more or less pale each side. Pygidium narrowly rounded at apex, not abnormally elevated

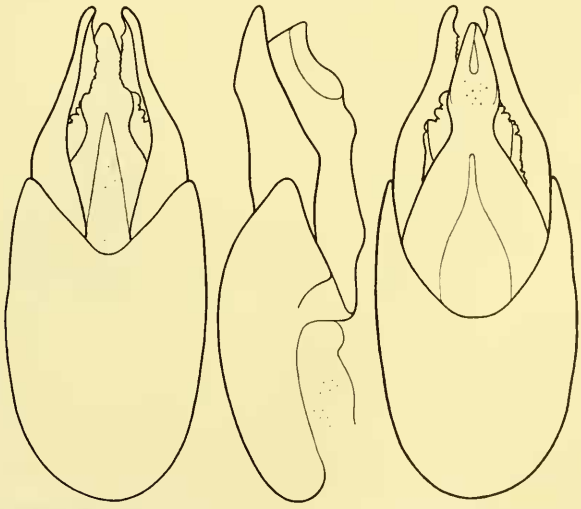

Fig. 7. *Photinus sabulosus* Green, new species. Holotype; Baltimore, Maryland, VII–21, F. E. Blaisdell (CAS). Male genitalia: ventral, lateral, and dorsal views, arranged in that order from left to right.

longitudinally, punctation similar to male, less dense except along apical and lateral borders.

VARIATIONS. The pronotal spot may be vittiform, narrowing only slightly posteriorly and attaining the basal margin, or it may be reduced to a pale brownish infuscation. The color of the elytra varies in being occasionally somewhat paler. Length 6–7.5 mm.

DISTRIBUTION. New York. *Ithaca:* 2 females, VII–15 & 26–90 (CU); 1 paratype, *Butternut Creek:* VII–21–17, H. Dietrich (CU). Pennsylvania. *Delaware County:* 1 paratype, VIII–2, W. J. Gerhard (CNHM). *Allegheny County:* E. A. Klages: 1 paratype, 3 females (CAS); 1 paratype, 3 females (CU); 1 paratype, 2 females, VI–11 (CU); 2 females, VII–18–29 (CU). *Allegheny:* 2 paratypes, J. B. Smith (USNM). *Ellwood City:* 1 paratype, VII–16–24 (CAS). *Hummelstown:* 2 paratypes, 1 female, VI–26–33 (OSU); 1 paratype, VII–5 (OSU); 1 female, VII–15 (OSU). *Lewisburg:* 1 paratype, VI–24–44, H. S. Barber (USNM). *Glenside:* 3 paratypes, VI–17 & 24–06, G. M. Greene (USNM). *Pequea:* 2 paratypes, IX–1–24, H. S. Barber (USNM). *Pittsburgh:* 1 paratype, VI–30 (CAS). *Jeanette:* 5 examples, VI–17 (OSC). *No definite locality:* 1 male, 3 females (SDSC); 1 paratype, 2 females (U.Mo); 1 paratype, 1 female, VI–17, H. G. Klages (CAS). New Jersey. *Fort Lee:* 1 male, VI–22–39 (Malkin). *Englewood:* 1 female, VII–25–20, E. D. Quirsfeld (CU). Maryland. *Plummers Island:* 1 female, VI–29–13 (INHS); 1 paratype, VI–28–05, H. S. Barber (CAS); 2 paratypes, VI–29–19, VI–27–05, H. S. Barber (USNM). *Baltimore:* holotype, 7 paratypes, 4 females, VII–2 to 21–09, F. E. Blaisdell (CAS); 1 paratype, VII–6–09, F. E. Blaisdell (Frost). *Cabin John Bridge:* 1 female, VI–23–29, J. C. Bridwell (USNM). *Priest Bridge:* 1 female, VII–31–29, H. S. Barber (USNM). *Beltsville:* 1 female, VII–30–32, H. S. Barber (USNM). *Bethesda:* 1 paratype, VII–8–51, D. W. Boddy (Malkin). *Glen Echo:* VI–23 & 30–29, Bridwell, 7 paratypes, 6 females (USNM); 1 paratype (CAS); 1 paratype (Frost). *Berwyn:* VII–22 & 31–27, A. B. Gahan, 9 paratypes (USNM); 1 paratype (CAS). District of Columbia. *Washington:* 2 paratypes, VII–4 & 5, Hubbard & Schwarz (USNM); 7 paratypes, VII–19–26, H. S. Barber (USNM); 1 paratype, VII–13–30, J. C. Bridwell (USNM); 2 paratypes, Rock Creek Park, VIII–8–28, H. S. Barber (USNM). Virginia. *Nelson County:* 1 female, VII–5–25, W. Robinson (USNM). *Buffalo Creek:* 1 paratype, VII–5–27, Chamberlain (CU). West Virginia. W. Sulphur: 1 paratype, VII–3–12, W. Robinson (USNM). *Berkeley:* 1 paratype, Hubbard & Schwarz (USNM). North Carolina. *Raleigh:* 3 paratypes, VI–30–25, C. S. Brimley (CAS); 1 female, VI–15–22, C. S. Brimley (CAS). Ohio. *Athens,* W. C. Stehr: 2 paratypes, VII–9–34 (CAS); 1 paratype, VI–30–34 (CAS); 1 female, VI–20–34 (CAS); 5 examples, VI–20 to VIII–9 (UO). *Athens County,*

W. C. Stehr: 1 female, Canaan Township, VII–24–47 (CAS); 1 female, Lodi Township, VI–26–47 (CAS); 2 examples, Lodi Township, VI–23 (UO); 3 examples, The Plains, VI–19 & 20 (UO). *Chillicothe:* 1 female, VI–24 (OSM). *Buckeye Lake:* 1 female, VIII–3 (OSM). *Delaware County:* 1 paratype, VIII–2, D. J. & J. N. Knull (OSU). *Green County:* 1 paratype, VI–8–50, D. J. & J. N. Knull (OSU). *Scioto County:* D. J. & J. N. Knull: 1 female, VI–17–44 (CAS); 2 females, VI–10 & 17–44 (OSU). *Hocking County:* D. J. & J. N. Knull, 1 paratype, VII–2 (CAS); 3 paratypes, 3 females, VI–20, VI–24, VII–2 (OSU). *Shawnee Forest:* 1 female, VI–9 (OSU). *Pomeroy,* Meigs County: 1 example, VI–29 (UO). *Zaleski,* Lake Hope; 3 females, VI–22, Ralph Leonard (UO). ILLINOIS. *Dubois:* 1 female, VII–3–09 (INHS). KENTUCKY. *Livingston:* 1 paratype, VI–17, Hubbard & Schwarz (USNM). TENNESSEE. *Elmwood:* 3 paratypes, 1 female, V, Corse (U.Mo). *Nashville:* 1 paratype, VI–23–93, H. Soltau (USNM). MISSISSIPPI. *Lucedale:* 4 paratypes, 1 female, V–11 to 28, H. Dietrich (CU).

Males of *P. sabulosus* are easily distinguished from all related species by the strongly roof-shaped pygidium. In the female the pygidium is also characteristic in being of a darker color and more strongly sclerotized than usual, and with the modified punctation as described above.

(8) **Photinus acuminatus** Green, new species

HOLOTYPE. MALE; base of Mt. Pisgah, North Carolina, VII–14–1939, D. L. Wray. In collection of California Academy of Sciences.

Form distinctly broader than in *P. marginellus.* Pronotum with broad

Fig. 8. *Photinus acuminatus* Green, new species. Holotype; Base of Mt. Pisgah, North Carolina, VII–14–39, D. L. Wray (CAS). Male genitalia: ventral, lateral, and dorsal views, arranged in that order from left to right.

dark median vitta attaining base and diffusing in anterior coarsely punctate area without reaching apex, widest in front where it slightly exceeds half the width of convex disk, feebly narrowing posteriorly to near base, then expanding. Scutellum and mesonotal areas dark piceous. Elytra dark piceous brown, sutural bead flavate nearly to scutellum, lateral pale border wider, exceeding width of explanate margin medially, rather broadly continuous around apex. Ventral segments 2 to 4 dark piceous, 5 to 9 pale; pygidium dark with sides indistinctly paler.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate. Epipleurae as in *P. marginellus*. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 8, pale fulvous. Length 7.5 mm.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Pronotal vitta narrower and somewhat paler. Ventral segments 2 to 4 piceous brown, 5 pale fulvous with irregular darker maculation baso-laterally and with apical border whitish testaceous, 6 entirely whitish testaceous, luminous in median third or more of width, 7 and 8 pale fulvous. Length 8.5 mm.

DISTRIBUTION. North Carolina. Base of Mt. Pisgah, holotype. Florida. *Newberry:* V–27–1927, M. D. Leonard, 1 female (CU).

This species looks quite unlike the other members of Division I. It more nearly resembles a small example of *P. consanguineus*, being similar to that species in its broader shape, wide pronotal vitta, and wide lateral pale border of the elytra. At present it is represented only by the unique male and female examples above described.

### (9) **Photinus pyralis** (Linné)

*Lampyris pyralis* Linné, 1767, Systema Naturae, ed. 12, 2:644.
*Lampyris rosata* Germar, 1824, Ins. Nov., p. 62.
*Lampyris centrata* Say, 1825, Acad. Nat. Sci. Philadelphia, Jour., 5:162.
*Photinus benignus* LeConte, 1881, Amer. Ent. Soc., Trans., 9:35 (new synonymy).

MALE. Form as shown in figure 19. Pronotum with median dark spot usually not attaining base and not entering anterior coarsely punctate area except sometimes diffusely; dark spot variable, usually narrowing posteriorly, sometimes much reduced and lightly colored, or absent altogether. Scutellum and mesonotal areas fulvous. Elytra usually dark piceous, varying to brownish, sutural bead fulvous, pale lateral border wider, not or only slightly exceeding width of explanate margin, narrowly continuous around apex. Ventral segments 2 to 4 dark piceous or brown, 5 piceous with broad pale apical border, this sometimes extending to base at sides, 6 to 9 pale; pygidium usually with sides broadly pale leaving a roughly T-shaped median dark area.

Head not or feebly concave between eyes, surface smooth with simple punctulation. Eyes large, separated medially above by less than diameter of eye. Mandibles stouter, as compared with other species of Division II. Disk of pronotum sparsely and minutely punctulate, with or without impressed median longitudinal line. Epipleurae distinct, narrow postbasal part much inflexed, attaining luminous segments. Ventral segments strongly transversely convex, 6 and 7 large, entirely luminous; apex of pygidium narrowly rounded. Aedeagus as in figure 9.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Ventral segment 5 with very narrow pale border, sometimes scarcely evident, 6 to 8 pale brownish, 6 pale and luminous in median third or more of width, 7 and sides of 6 sometimes darker piceous; pygidium usually abruptly paler than preceding tergites.

LENGTH. Both sexes, 9–15 mm.

DISTRIBUTION. New York (southern); Pennsylvania; Ohio; Indiana; Illinois; New Jersey; Maryland; Virginia; West Virginia; Kentucky; Tennessee; North Carolina; Georgia; Florida; Alabama; Mississippi; Louisiana; Arkansas; Missouri; South Dakota; Nebraska; Kansas; Oklahoma; Texas. Also the following, perhaps accidental introductions: Colorado, no definite locality, C. V. Riley collection (USNM); Arizona, Phoenix, VI–2–42, E. S. Ross (CAS).

This abundant species, distributed throughout an extensive territory, is naturally subject to some variation. LeConte separated *P. benignus* from *P. pyralis* on insignificant and variable characters that do not justify its

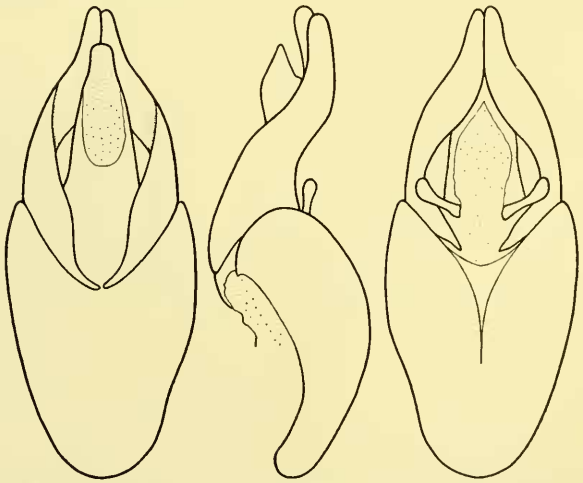

Fig. 9. *Photinus pyralis* (Linné). Johnson City, Tennessee, VI–12–51, Bryant (CAS). Male genitalia, dorsal, lateral, and ventral views, arranged in that order from left to right.

retention as a named taxonomic unit. In the Brownsville region of Texas there is developing an incipient race characterized by a smaller average size, shorter antennae, dusky scutellum, entirely dark pygidium, and slightly more acutely rounded elytral apices. Not one of these distinctions is as yet sufficiently stabilized to permit an accurate segregation of this form. A most unusual variant, perhaps an abnormal specimen, is a male from Uvalde, Texas, in the collection of the California Academy of Sciences. It is rather broader than is normal for *P. pyralis;* the pronotum, scutellum, and mesonotal areas are clear fulvous, the pronotal dark spot totally lacking; the elytra are entirely black, the explanate lateral margins only slightly less dark; and the pale apical border of ventral segment 5 is very feebly indicated.

### (10) **Photinus australis** Green, new species

HOLOTYPE. MALE. Snead, Florida, VI–15–51, Price, Beamer, and Weed. In collection of University of Kansas.

Form less elongate than in *P. pyralis.* Pronotum with black median vitta of nearly uniform width throughout, attaining base but not apex, expanding diffusely in anterior coarsely punctate area. Scutellum fulvous, mesonotal areas dusky. Elytra dark piceous, nearly black, sutural bead fulvous, pale lateral border somewhat wider than explanate margin, of nearly uniform width and rather sharply defined internally from humerus to apical third, thence narrow and poorly defined, narrowly continuous around apex. Ventral segments 2 to 5 fuscous, each with a narrow fulvous

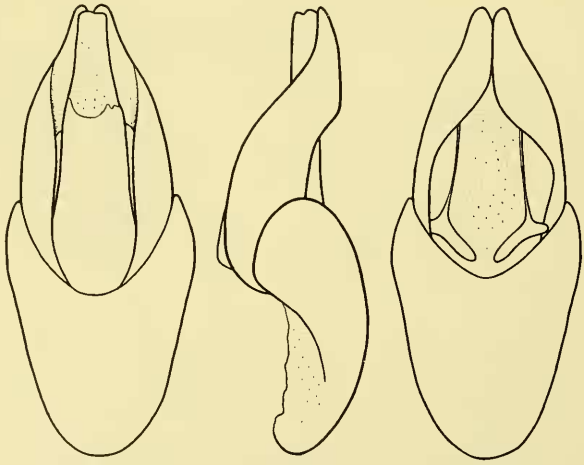

Fig. 10. *Photinus australis* Green, new species. Paratype; N. Wilkesboro, North Carolina, VII–34, F. Perlmutter (CAS). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

submedian fascia nubilously defined, surface posterior to fascia largely pale in segment 4 and entirely pale in segment 5, segments 6 to 9 pale; pygidium with sides broadly pale.

Head concave between eyes, surface roughened with irregular granulose punctation; eyes large, separated medially above by less than diameter of eye, their inner margins distinctly converging anteriorly; mandibles slender. Disk of pronotum minutely and sparsely punctulate. Epipleurae narrow except at base, strongly inflexed, attaining abdomen. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 10. Length 8 mm.

FEMALE. Alate, similar to male. Head not concave between eyes but with similar granulose punctation; eyes smaller, separated by more than diameter of eye. Pronotal vitta broader, narrowed near base. Ventral segments 2 to 5 piceous brown, 5 with broad pale apical border, 6 pale, more or less fuscous each side, luminous in median third of width, 7 and 8 tinged with brown.

VARIATIONS. The pronotal vitta may not quite attain the basal margin, varying in color from black to pale brown. The scutellum and mesonotal areas may be entirely pale, or the base of the scutellum and adjoining area may be dusky. Ventral segments 2 to 4 of the male may be definitely pale only at the sides, or with both apical and lateral borders pale. Length 6.5–10.25 mm.

DISTRIBUTION. INDIANA. *Vincennes:* 2 males, VII–11 (U.Mich). ILLINOIS. *Dubois:* 1 paratype, VII–2–09 (INHS). NORTH CAROLINA. *N. Wilkesboro:* 1 paratype, VII–2–34, E. Perlmutter (CAS). GEORGIA. *Atlanta:* 1 paratype, VI–24–38, P. W. Fattig (CAS); 1 paratype, VII–13–40, P. W. Fattig (CAS); 1 female, VII–8–37, P. W. Fattig (CAS); 1 female, VII–16–47, P. W. Fattig (USNM). *Ellijay:* 1 paratype, VII–20–45, P. W. Fattig (CAS). FLORIDA. *Snead:* holotype, 3 paratypes, VI–15–51, Price, Beamers, & Weed (U.Kans); 2 paratypes, same data (CAS). ALABAMA. *Cleburne County:* 1 male, Summit of Mt. Cheaha, VII–5 (U.Mich). MISSISSIPPI. *Hattiesburg:* 3 paratypes, Camp Shelby, VII–7 & 10, C. D. Michener (AMNH). *Meridian:* 1 paratype, VII–12–95, H. Soltau (USNM). MISSOURI. *Cameron:* 1 male, VII–4 (McClay). *Jefferson City:* 1 male, VII–18 (W. W. Dowdy, Lincoln University).

The principal characters separating both sexes of *P. australis* from *P. pyralis* and *P. scintillans* are summarized as follows:

Males of *P. australis* differ from *P. pyralis* in their smaller average size and less elongate form; larger eyes with their inner margins above more definitely converging anteriorly; smaller and more slender mandibles; more approximate antennae; the head concave between the eyes with the

surface subgranulosely punctate; and ventral segments 2 to 4 not totally dark piceous.

Females of *P. australis* differ from *P. pyralis* in their smaller and more slender mandibles; and the subgranulose punctation of the head between the eyes.

Males of *P. australis* differ from *P. scintillans* in their larger average size; larger eyes with their inner margins above more definitely converging anteriorly; wider epipleurae; more or less fuscous or piceous ventral segments 2 to 4; and in having the dorsal surface of the median lobe of the aedeagus membraneous in about distal third.

Females of *P. australis* differ from *P. scintillans* in not being brachypterous.

### (11) **Photinus scintillans** (Say)

*Lampyris scintillans* Say, 1825, Acad. Nat. Sci. Philadelphia, Jour., 5:163.

MALE. Form as in *P. marginellus*. Pronotum with median brownish spot about one-third to one-fourth as wide as convex disk, widest in front and narrowing posteriorly, usually not attaining base or apex. Scutellum pale with base more or less dusky, rarely entirely dark; mesonotal areas pale. Elytra dilute reddish brown, varying to darker piceous, sutural bead flavate, lateral pale border confined nearly to explanate margin, well defined only in darker specimens. Ventral surface of abdomen entirely pale, rarely segments 2 to 4 are faintly darker.

Head concave between eyes, surface roughened with irregular granulose

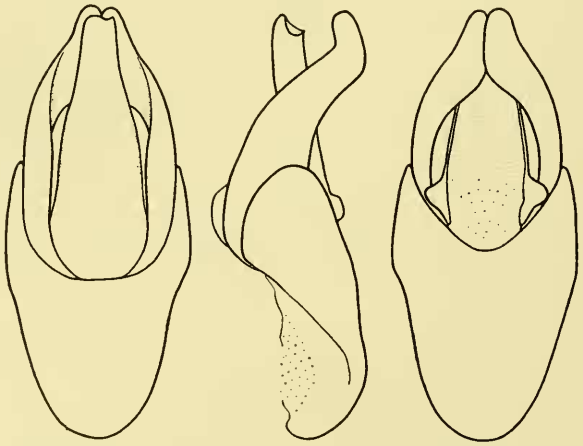

Fig. 11. *Photinus scintillans* (Say). Easton, Pennsylvania, VI–13–34, J. W. Green (CAS). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

punctation; eyes large, separated medially above by less than diameter of eye. Disk of pronotum finely and sparsely punctulate, median line distinctly impressed, at least in part. Epipleurae very narrow except at base, scarcely attaining metacoxae. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 11.

FEMALE. Dissimilar, brachypterous, texture firm. Form compact, abdomen usually somewhat inflated and distinctly wider than elytra. Eyes smaller, separated by about diameter of eye. Elytra varying from one-fourth longer to nearly twice as long as pronotum, strongly dehiscent from scutellum. Ventral segment 6 luminous in median third or more of width. Color pattern as in male.

LENGTH. Both sexes, 6.5–8.5 mm.

DISTRIBUTION. NEW YORK. *New York:* Van Cortland Park, VI–27–40 (Malkin). *Staten Island:* (AMNH). PENNSYLVANIA. *Easton:* VI–7 to VIII–27, mostly VI (CAS). *York County:* Washington Township, VII–11–53, P. J. Spangler (CAS); Detters Mill, VI–9–49, P. J. Spangler (U.Mo & CAS). *Lewisburg:* VI–24–44, H. S. Barber (USNM). *Allegheny County:* VI–11, E. A. Klages (CU). *Hummelstown:* VI–24 & VII–10 (OSU). *Bethlehem:* VI–01 (CNHM). *Lenhartsville:* VII–8 (AMNH). *Wyomissing:* VI–21 (McClay). NEW JERSEY. *Newark:* VI–10 (AMNH). *New Brunswick:* VI–19 (AMNH). *Ramsey:* VI–29, VII–6 (AMNH). *Boonton:* VI–20–01, G. M. Greene (USNM). *Alpine:* VII–9–48, J. G. Rozen (U.Cal). MARYLAND. *Glen Echo:* VI–23–29, J. C. Bridwell (USNM). *Plummers Island:* VII–23–20, H. S. Barber (USNM); VI–6–19 (CNHM). *Baltimore:* VII–6 & 12–09, F. E. Blaisdell (CAS). DISTRICT OF COLUMBIA. *Washington:* VII–13, Hubbard & Schwarz (USNM). DELAWARE. Newark: V–28 (INHS). *Wilmington:* V–5–38, F. A. McDermott (USNM). VIRGINIA. *Great Falls:* VI–6–41 (Malkin). *Black Pond:* VII–1–26, H. S. Barber (USNM).

This species bears a close superficial resemblance to the more abundant and much more widely distributed *P. marginellus*, and the two have often been found indiscriminately mixed in collections. External differences readily separating the males, of specimens in good condition, are as follows: In *P. scintillans* the head is concave between the eyes with the surface irregularly granulose-punctate; the underside of the abdomen is entirely pale; the exposed part of the last ventral segment is narrowly subtriangular; and the epipleurae are distinctly visible only basally. In *P. marginellus* the head is flat between the eyes with the surface not granulose; the basal segments of the abdomen beneath are brown or fuscous; the exposed part of the last ventral segment is more broadly subtriangular, nearly equilateral; and the epipleurae are wider, less abruptly narrowed basally, and quite distinct as far as the luminous segments.

(12) **Photinus brimleyi** Green, new species

*Photinus brimleyi* Wray not Green, *nomen nudum*, 1950, North Carolina Dept. Agric., 2nd Sup. Ins. of N. C., p. 16.

HOLOTYPE. Male. Crailhope, Kentucky, VII–8–46, Carl Cook. In collection of California Academy of Sciences.

Form similar to *P. consanguineus*. Pronotum with median dark spot not attaining base or apex, narrowing posteriorly, abruptly wider in front, diffusely entering anterior coarsely punctate area. Scutellum and mesonotal areas pale fulvous. Elytra dark brownish piceous, sutural bead fulvous, lateral pale border wider, distinctly exceeding width of explanate margin medially, rather broadly continuous around apex; epipleurae entirely pale fulvous. Ventral segments 2 to 5 piceous black, 6 to 9 pale; pygidium dark.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum finely and sparsely punctulate, impressed median longitudinal line defined by convexity of surface each side. Epipleurae narrow except at base, attaining abdomen. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 12, pale fulvous, lateral lobes darker except at base and apex. Length 10.5 mm.

FEMALE. Dissimilar, brachypterous. Body elongate, of soft larval texture, pale fulvo-testaceous throughout, elytra basally and pronotum anteriorly somewhat darker, pronotum without median dark spot, elytra without paler borders. Eyes smaller, separated by slightly more than diameter of eye. Elytra one-third longer than pronotum, attaining basal margin

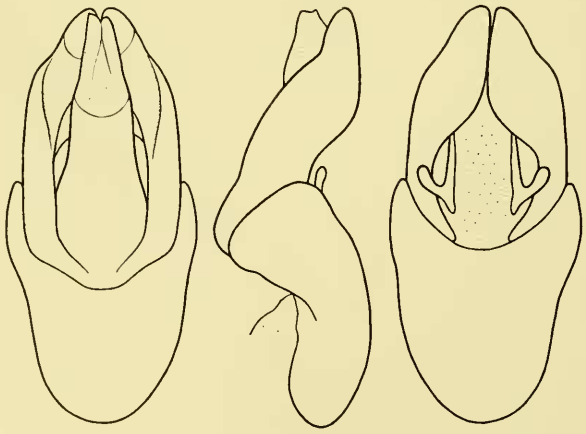

Fig. 12. *Photinus brimleyi* Green, new species. Holotype; Crailhope, Kentucky, VII–8–46, Carl Cook (CAS). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

of tergite 2, strongly dehiscent from near scutellum. Abdomen above finely and densely granulate-punctate. Ventral segment 6 luminous in median third of width; pygidium narrowly rounded at apex. A single example collected at Crailhope, Kentucky, by Carl Cook, VII–2–49, in collection of California Academy of Sciences. Length 11.75 mm.

VARIATIONS. The pronotal spot varies as usual in size, and in color from nearly black to pale brown, rarely entirely lacking. The median longitudinal impression of the pronotum varies from quite deep to shallow, or nearly obliterated. The color of the elytra varies to a somewhat dilute brownish piceous, with the sutural pale border expanding slightly toward base. In one specimen from the type locality, apparently conspecific, the pronotal spot is broadly vittiform, as in *P. consanguineus,* nearly reaching the basal margin. This specimen is also anomalous in having the lateral pale border of the elytra confined nearly to the explanate margin. Length 8–12.5 mm.

DISTRIBUTION. KENTUCKY. *Crailhope:* holotype, 167 paratypes, 1 female, V–14 to VIII–21, Carl Cook (CAS); 30 paratypes, same data (U.Kans, AMNH, OSU, INHS, USNM, CU, ANSP, CNHM, CM, Frost, Malkin). NORTH CAROLINA. *Hendersonville:* 2 males, VI–1907, F. Sherman (CAS); 1 male (NCDA). GEORGIA. *Rabun County:* 4 males, VII (AMNH). *Fort Mountain:* 1 male, VII–9–37, P. W. Fattig (CAS). ARKANSAS. *Cove:* 7 males, VI–20–38, L. W. Hepner (U.Kans). *Scott County:* 3 males, VIII–24–28, R. H. Beamer (U.Kans).

The author is greatly indebted to Carl Cook, of Crailhope, Kentucky, for the large series of paratypes of this species, and for the female specimen described above. A second female received from Mr. Cook was sent to the late H. S. Barber, who at that time expected to revise the U. S. species. The first specimens of *P. brimleyi* were sent in by the late C. S. Brimley, of the North Carolina Department of Agriculture. Examples returned to him with the manuscript name "*Photinus brimleyi*" were responsible for the *nomen nudum* appearing in the second supplement of the Insects of North Carolina (Wray, 1950). It is probable that additional species related to *P. brimleyi* may occur in the western limits of its range. Inadequate material from Arkansas suggesting this possibility has been found in several of the collections examined.

DIAGNOSTIC CHARACTERS. Male: form similar to *P. consanguineus;* ventral segments 2 to 5 entirely dark piceous; genitalia of the *P. punctulatus* group; disk of pronotum minutely and sparsely punctulate; lateral pale border of elytra much wider than explanate margin; epipleurae entirely fulvous; scutellum and mesonotal areas fulvous; pygidium and preceding tergites concolorous, dark piceous. Female brachypterous.

### (13) **Photinus punctulatus** LeConte

*Photinus punctulatus* LeConte, 1851, Acad. Nat. Sci. Philadelphia, Proc., (2), 5:335.

MALE. Form similar to *P. pyralis.* Pronotum with central dark spot narrowing posteriorly, nearly attaining base. Scutellum usually piceous or black with pale apex, varying to entirely pale; mesonotal areas fulvous. Elytra dark piceous or black, sutural bead and narrowly explanate side margin pale fulvous, pale color more or less distinctly continuous around apex; epipleurae fuscous basally. Ventral segments 2 to 5 piceous black, 6 to 9 pale; pygidium abruptly pale flavate, preceding tergites dark piceous.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum closely punctate, punctures small, impressed, separated by about their diameters, sometimes finer on pale areas; median longitudinal line narrow and deeply impressed. Epipleurae very narrow except at base, scarcely attaining abdomen. Ventral segments 6 and 7 large, entirely luminous. Aedeagus similar in structure to figure 12.

FEMALE. Dissimilar, elongate, brachypterous; texture firm. Eyes smaller, separated by more than diameter of eye. Antennae shorter. Elytra very short, subequal in length to pronotum, not extending beyond first abdominal tergite, strongly dehiscent from near scutellum. Pronotum and elytra colored as in male; abdomen above piceous black or brown, lateral and sometimes apical borders of tergites more or less rufous, pygidium pale. Ventral segment 6 pale and luminous in median third or more of width.

LENGTH. Both sexes, 8:5–11 mm.

DISTRIBUTION. Illinois. *Pittsfield:* VI–11–47, VI–8–48, B. Caldwell (CAS); VI–20–52, B. Caldwell (U.Cal); IV–3 to VIII–4 (McClay). *Peoria:* VI–25–24, F. A. McDermott (USNM); VII–1 (INHS). *Springfield:* VII–2–38, J. W. Green (CAS). *Havana:* V–21–32, Ross & Mohr (CAS, INHS). *Normal:* V–28 (INHS). *Bloomington:* VI–1 (INHS). Iowa. *Iowa City:* VI–1–37, J. P. E. Morrison (USNM); VI–10 and VII–20, Wickham (USNM). Missouri. *Sedalia:* V–17–39, W. L. Wright (U.Mo). *Yarrow:* V–13–50, Frank Weber (U.Mo). *Lake of Ozarks:* V–6–50, V. D. Goodnight (U.Mo). Kansas. *Lawrence:* 900 ft., E. S. Tucker (U.Kans). *Oskaloosa:* V–11–49, R. H. Beamer (U.Kans). *Atchison:* V (USNM). *Topeka:* Popenoe (KSC). *Riley County:* V–21, F. Marlatt (CAS). Oklahoma. *Comanche County:* Wichita Mountains Game Refuge, F. B. McMurry (USNM). Texas. *Nacogdoches:* IV–6 (AMNH).

This species is one of the most easily recognized of the Nearctic fauna. The pale pygidium, contrasting sharply with the preceding dark piceous tergites, is duplicated only in the narrowly elongate *P. lineellus,* occurring in the extreme Southeast. The distinctly punctate pronotum is a unique

characteristic of *P. punctulatus,* although it is approached somewhat in *P. frosti.* In the latter species the pygidium and preceding tergites are concolorous dark piceous.

(14) **Photinus tenuicinctus** Green, new species

HOLOTYPE. MALE; Fayetteville, Washington County, Arkansas, VII–14–53, L. H. Rolston. In collection of California Academy of Sciences.

Form similar to *P. consanguineus.* Pronotum with broad median dark spot narrowing posteriorly and nearly attaining base, diffusing in anterior punctate area without reaching apex. Base of scutellum and mesonotal areas dark piceous, scutellum pale in about apical half. Elytra dark brownish piceous, sutural bead flavate, lateral pale border not wider, confined to outer edge of explanate margin, narrowly continuous around apex; epipleurae dusky throughout. Ventral segments 2 to 5 piceous black, 6 to 9 pale; pygidium dark.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum finely and rather closely punctulate, punctures more or less granulate, especially on pale areas; impressed median longitudinal line defined by convexity of surface each side. Epipleurae narrow except at base, attaining abdomen. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 13, pale fulvous, lateral lobes mostly dark piceous. Length 11.5 mm.

FEMALE. Unknown, probably brachypterous.

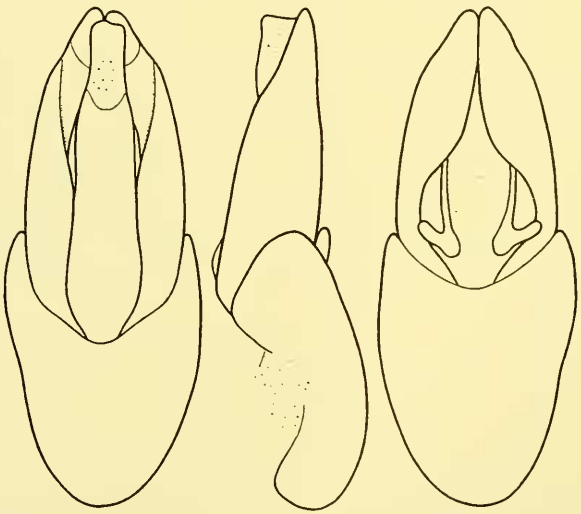

Fig. 13. *Photinus tenuicinctus* Green, new species. Paratype; Mt. Sequoyah, Washington County, Arkansas, VI–20–38, M. W. Sanderson (CAS). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

VARIATIONS. The pronotal vitta varies from one-third to three-fifths as wide as the convex disk, and is usually broad at the basal extremity, somewhat is in *P. consanguineus*. The punctulation of the pronotal disk may be almost entirely granulate, or granulate only at the sides. In one undercolored individual, possibly teneral, the scutellum is entirely pale, and the lateral pale border of the elytra appears to cover all of the explanate margin, although a vague demarcation in the usual place is discernible. Length 8.5–11.5 mm.

DISTRIBUTION. Arkansas. *Fayetteville,* Washington County: VI–14–53, L. H. Rolston: holotype, 8 paratypes (CAS); 4 paratypes (U.Ark); 1 paratype (Frost); 1 paratype (OSU). *Mt. Sequoyah,* Washington County: M. W. Sanderson: 1 paratype, VII–17–38 (CAS); 1 paratype, VII–20–38 (CAS); 1 paratype, VI–20–38 (CAS); 1 paratype, VII–14–38 (INHS); 1 male, VII–8–40 (INHS). Oklahoma. Locust Grove: 1 paratype, VI–29–53, D. J. & J. N. Knull (OSU). *Ellerville:* 1 paratype, VI–20–37, Standish-Kaiser (CAS).

This species is unique in our fauna in having the lateral pale border of the elytra confined to the outer edge of the explanate margin. The author is greatly indebted to Dr. L. H. Rolston for the good series from which the holotype was selected.

### (15) **Photinus frosti** Green, new species

HOLOTYPE. MALE; Levy County, Florida, IV–3–54, H. V. Weems, Jr. In collection of California Academy of Sciences.

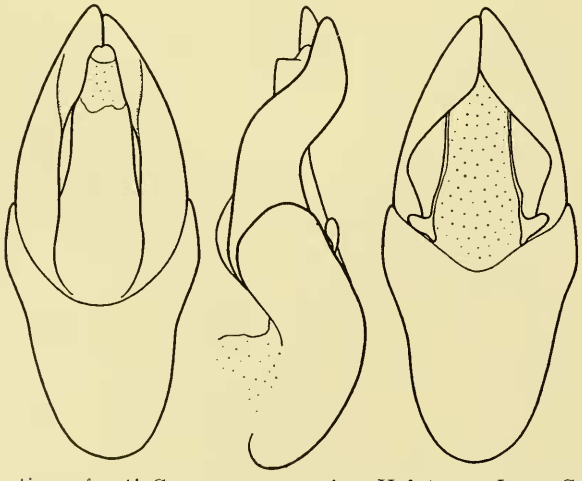

Fig. 14. *Photinus frosti* Green, new species. Holotype; Levy County, Florida, IV–3–54, H. V. Weems, Jr. (CAS). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

Form similar to *P. consanguineus*. Pronotum with subtriangular central dark spot not quite attaining base and not entering anterior coarsely punctate area, widest in front where it is about one-third as wide as convex disk, narrowing posteriorly. Scutellum piceous black, apical half fulvous, mesonotal areas clear pale fulvous. Elytra piceous black, sutural bead fulvous, lateral pale border wider, scarcely exceeding width of explanate margin medially, narrowly continuous around apex; epipleurae fuscous basally. Ventral segments 2 to 5 black, 6 to 9 pale; pygidium dark piceous.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum with deep median longitudinal channel, surface more strongly and closely punctate than usual, punctures coarser on dark area, separated by one to three times their diameters, smaller and less regularly spaced than in *P. punctulatus*. Epipleurae very narrow except at base, attaining abdomen. Ventral segments 6 and 7 large, entirely luminous. Aedeagus as in figure 14, pale fulvous, dorsal inner margins of lateral lobes feebly infuscate subdistally. Length 9 mm.

FEMALE. Unknown, probably brachypterous.

VARIATIONS. The single paratype differs from the holotype in the slightly paler elytra with the fulvous borders continuing rather broadly around the apices. Length 7.5 mm.

DISTRIBUTION. FLORIDA. *Levy County:* holotype. LOUISIANA. *Ida:* 1 paratype, VI–6–51, Price, Beamers, & Weed (U.Kans).

This species is named in honor of Mr. C. A. Frost, from whom the holotype was received, having been sent to him for identification by Dr. H. V. Weems, Jr., of the Florida State Plant Board. The author is greatly indebted to Dr. Weems for permission to retain the holotype on permanent deposit in the collection of the California Academy of Sciences. The comparatively coarse punctation of the pronotal disk distinguishes *P. frosti* from all related species except *P. punctulatus*. In the latter species the pronotal punctation is still coarser, closer, and more regularly spaced; and the pygidium is abruptly pale, contrasting sharply with the preceding dark tergites. In *P. frosti* the pygidium and preceding tergites are concolorous dark piceous.

### (16) **Photinus umbratus** LeConte

*Photinus umbratus* LeConte, 1878, Amer. Philos. Soc., Proc., 17:407.

MALE. Form similar to *P. consanguineus*. Pronotum with median dark spot not attaining base or apex, narrowing posteriorly, abruptly and diffusely expanding in anterior coarsely punctate area. Scutellum and mesonotal areas fulvous. Elytra piceous black, sutural bead and narrowly explanate lateral margin fulvous, pale color distinctly limited internally,

narrowly continuous around apex. Ventral segments 2 to 5 black, 6 to 9 pale; pygidium dark piceous.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate, punctures more or less subgranulate, at least at sides; median longitudinal line distinctly impressed. Epipleurae very narrow and subobsolete except at base. Ventral segments 6 and 7 large, entirely luminous. Aedeagus pale flavate, similar in structure to figure 15, median lobe broader.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Ventral surface of abdomen dark piceous, slightly paler apically, segment 6 pale and luminous in median third or more of width.

LENGTH. Both sexes, 6.5–8 mm.

DISTRIBUTION. North Carolina. *Dunn:* V–31 (NCDA). South Carolina. *Charleston:* II–11–32, on okra from Cuba (USNM). Georgia. *Thomasville:* VI–14, P. W. Fattig (Em.U). *Okefenokee Swamp:* VII–25–39. P. B. Lawson (U.Kans). Florida. *Baldwin:* VI–1 (MCZ – LeConte type); VI–10, Hubbard & Schwarz (USNM). *Cocos Beach:* VII (CU). *Deland:* VII–8–39, A. T. Hardy (U.Kans). *Tampa:* X–4 (MCZ – LeConte col.). *Enterprise:* (AMNH). *Lake Placid:* III–6 to V–8, J. G. Needham (CU). *Leesburg:* Lake County, VIII–24–38, Hubbell & Friauf (CAS). *Plant City:* VIII–15–30, J. O. Nottingham (U.Kans). *Sebastian:* VII–27–48, H. W. Crowder (U.Kans). *Winter Park:* IV–4, A. B. Klotz (AMNH). *Jupiter:* V–19–48, M. Cazier (AMNH). *Punta Gorda:* IV–10–40, H. Ramstadt (CNHM). Alabama. *Cowarts:* VIII–1 (AMNH). Mississippi. *Hattiesburg:* VII–30 (AMNH). *Lucedale:* V–14–30, H. Dietrich (CU & CAS). *Wareland:* V–25–92, H. Soltau (USNM). Louisiana. *Pearl River:* VI–4–93, H. Soltau (USNM).

This species is the only member of the *P. punctulatus* group in which the female is known to be alate and similar to the male. In color pattern it closely resembles *P. collustrans,* differing only in pronotal maculation—the dark area median in *P. umbratus* and anterior in *P. collustrans.* Sometimes, although rarely, the pronotal dark area of *P. collustrans* may extend posteriorly along the median channel in imitation of *P. umbratus,* but these atypical individuals may as a rule be readily identified by their more elongate form and shorter antennae.

### (17) **Photinus collustrans** LeConte

*Photinus collustrans* LeConte, 1878, Amer. Philos. Soc., Proc., 17:407.

MALE. Form elongate, as shown in figure 19. Disk of pronotum rufous or fulvous, anterior coarsely punctate area dark piceous, more or less diffusely so in front, dark color sometimes extending posteriorly a short dis-

tance along median channel. Scutellum and mesonotal areas fulvous. Elytra piceous black, sutural bead and narrowly explanate lateral margin fulvous. pale color distinctly limited internally, narrowly continuous around apex. Ventral segments 2 to 5 piceous black, 6 to 9 pale; pygidium black.

Eyes large, separated medially above by less than diameter of eye. Pronotum only slightly wider than long, usually broadly rounded in front, lateral margins subparallel; disk with deeply impressed median longitudinal channel extending to base, surface finely and sparsely punctulate, punctures more or less subgranulate laterally. Elytra each tapering posteriorly, lateral and sutural margins feebly converging from humerus to near apex; epipleurae subobsolete except at base. Ventral segments 6 and 7 large, entirely luminous; apex of pygidium bisinuately subtruncate. Aedeagus pale fulvous, similar in structure to figure 15.

FEMALE. Dissimilar, elongate, brachypterous, of soft larval texture. Pronotum, scutellum, and elytra colored as in male; adbomen pale fulvous throughout, terminal tergites slightly darker, ventral segment 6 whitish and luminous in median third or more of width. Eyes small, separated by slightly more than diameter of eye. Elytra slightly longer than pronotum, attaining middle of first abdominal tergite, strongly dehiscent from scutellum. Three examples collected at Gainesville, Florida, V–25 & VI–5–47, Jack Stevens (CAS).

LENGTH. Both sexes, 5.25–9.5 mm.

DISTRIBUTION. Georgia. *Okefenokee Swamp:* VII–30–48, L. D. Beamer (U. Kans); Billy's Island, VI (CU). *Decatur County:* Spring Creek, VI–7 to 23 (CU). Florida. *Enterprise:* V–20 (MCZ – LeConte type); IV–23 (CAS); IV–24 (OSU). *Fort Myers:* IV–23 (AMNH); VIII–11–30, L. D. Tuthill (U.Kans). *Lake Placid:* V–8 (CU). *Lakeland:* XI–10 (AMNH). *Kissimmee:* (AMNH). *Eau Gallie:* VIII–8 (U.Mich). *Stuart:* V–13 (U.Mich). *Dunellen:* VIII–3 (U.Mich). *Fort Lauderdale:* IV–6–47, J. W. Green (CAS). *Gainesville:* V to VIII, J. Stevens (CAS). *Osceola County:* IV–4–50 (U.Fla). *Ocala N. F.:* V–17–39, D. J. & J. N. Knull (OSU). *Arcadia,* De Soto County: III–30–54, H. E. Evans (CU). *Zolfo Springs,* Hardee County: IV–2–46, G. Rueckert (CNHM). *Okeechobee:* VII–9 (UO).

### (18) **Photinus stellaris** Fall

*Photinus stellaris* Fall, 1927, Brooklyn Ent. Soc., Bull., 22:210.

MALE. Form elongate, as in *P. collustrans.* Pronotum without central dark spot, convex disk rufous, coarsely punctate borders flavate, the anterior rarely somewhat dusky. Scutellum and mesonotal areas fulvous. Elytra entirely black. Ventral segments 2 to 5 dark piceous, 6 to 9 pale; pygidium black.

Eyes large, separated medially above by less than diameter of eye. Pronotum only slightly wider than long, usually broadly rounded in front, lateral margins subparallel; disk with deeply impressed median longitudinal channel, surface irregularly punctulate, punctures fine and sparse medio-anteriorly, coarser and denser at sides and base. Elytra each tapering posteriorly, lateral and sutural margins feebly converging from humerus to near apex; epipleurae subobsolete except at base. Ventral segments 6 and 7 large, entirely luminous; apex of pygidium bisinuately subtruncate. Aedeagus as in figure 15, pale fulvous.

FEMALE. Dissimilar, elongate, brachypterous, of soft larval texture. Pronotum, scutellum, and elytra colored as in male; abdomen pale flavate throughout, terminal tergites somewhat darker, ventral segment 6 whitish and luminous in median third or more of width; legs pale. Eyes small, separated by slightly more than diameter of eye. Antennae short and stout, subcylindrical, segment 3 about one-third longer than 2, 2 to 10 each nearly as wide as long. Elytra slightly shorter than pronotum, attaining first abdominal tergite, strongly dehiscent from near scutellum. Three examples collected 7 miles S.E. of Fort Davis, Texas, V–15–28, Barber, Lattimer, & Russell (USNM).

LENGTH. Both sexes, 6.5–9 mm.

DISTRIBUTION. TEXAS. *Alpine:* VI–15 to 30, O. C. Poling (CAS); V–1 to VIII–1 (CU). *Marfa:* VII–12–11, J. W. Green (CAS). *Fort Davis:* V–15 to 25, IX–15 to 30, X–15 (CU); Limpia Canyon, VII–15 (AMNH);

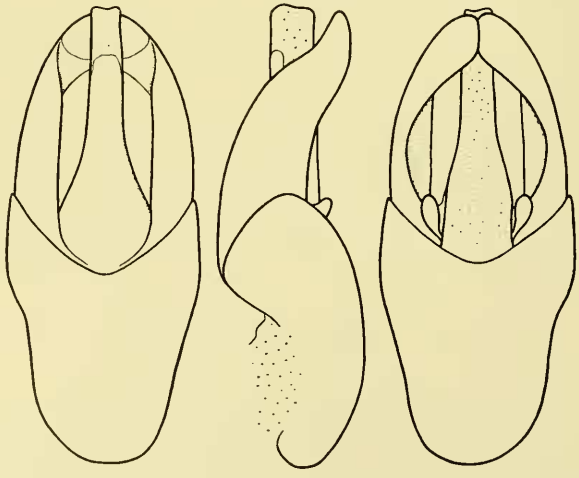

Fig. 15. *Photinus stellaris* Fall. 7 mi. SE Fort Davis, Texas, VI–22–48, H. S. Barber (USNM). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

VI–12–48, H. S. Barber (USNM); 7 mi. S.E., VI–12–48, Barber, Lattimer, & Russell (USNM); V–15–28, Chamberlain (CAS). *Davis Mountains:* VI–2 (OSU). *Brewster County:* VI–VII (CU, CAS). *Uvalde County:* V–3 & 11 (OSU). *Uvalde:* IV–29–15, D. C. Parman (USNM). *Val Verde County:* V–13 (OSU). *Comal County:* V–19 (OSU). *Sonora:* IV, V–3 & 9 (A & M.Tex). *Del Rio:* IV–13–49, Michener & Beamer (U.Kans). *San Juan:* VI–28–38, L. W. Hepner (U.Kans). *Rio Frio:* V–11–10, F. C. Pratt (USNM). *Mills:* (AMNH).

### (19) **Photinus granulatus** Fall

*Photinus granulatus* Fall, 1927, Brooklyn Ent. Soc., Bull., 22:209.

MALE. Form similar to *P. collustrans,* elytra less elongate, usually not reaching abdominal apex. Pronotum with central subtriangular dark spot, widest in front, not attaining base or apex. Scutellum and mesonotal areas pale fulvous. Elytra piceous black or brown, sutural bead flavate, lateral pale border somewhat wider medially than the very narrow explanate margin, narrowly continuous around apex. Ventral segments 2 to 5 dark piceous, 6 to 9 pale; pygidium dark.

Eyes large, separated medially above by less than diameter of eye. Antennae short, subcylindric, feebly compressed distally. Pronotum usually broadly rounded in front, lateral margins subparallel; disk with median longitudinal channel shallow, often poorly defined and more or less obsolete anteriorly, surface rather coarsely and irregularly granulate-punctate. Elytra each tapering posteriorly, lateral and sutural margins feebly converging from humerus to near apex; epipleurae obsolete except at base. Ventral segments 6 and 7 large, entirely luminous; apex of pygidium broadly rounded or subtruncate. Aedeagus pale fulvous, similar in structure to figure 15, median lobe broader, ventro-basal processes rudimentary.

FEMALE. Dissimilar, elongate, brachypterous, apparently apterous. Pale fulvous above and beneath, pronotum with convex disk nubilously fuscous anteriorly, elytra slightly darker, margins and base pale. Antennae fuscous, short and stout, second segment subequal in length to third. Eyes small, separated by slightly more than diameter of eye. Pronotum granulate as in male. Elytra very small, about three-fourths as long as pronotum, attaining basal fifth of first abdominal tergite, strongly dehiscent from scutellum. Lateral extension of metacoxa bent obliquely forward in line with oblique posterior margin of metepimeron, ventral segment 1 plainly visible at sides, subequal in length to ventral segment 2. Ventral segment 6 apparently luminous in median third of width. One example, collected on alfalfa at Manhattan, Kansas, VII–2–24, I. Kenberry (KSC).

LENGTH. Both sexes, 5.5–8 mm.

DISTRIBUTION. Kansas. *Riley County,* Popenoe: (KSC & CAS). *Lawrence,* VII–1–53, P. J. Spangler (U.Mo); VI–27–53, P. J. Spangler (CAS); VII–13–50, H. S. Fitch (U.Cal). *Douglas County:* VI–9 to 15–1919, W. E. Hoffman (CAS & U.Kans). *Emporia:* VI–11 (McClay). *Madison:* M. C. Van Duzee (CAS). *Wellington:* VII–1–50, R. P. Allen (CAS). Oklahoma. *Sapulpa:* V–25, F. C. Bishop, J. D. Mitchell (USNM). Texas. *College Station:* VI & VII–1932, J. C. Gaines (A & M.Tex). *Mexia:* VII–27–37 (A & M.Tex).

This is one of the most easily recognized Nearctic species of *Photinus* because of the strongly granulate disk of the pronotum. The terminal antennal segment of the female appears from some viewpoints to have a minute globular apical constriction resembling the terminal appendix of the tribe *Lampyrini.* The female of *Lampyris noctiluca,* and probably of other species of the genus, have abdominal ventral segment 1 exposed at the sides in the same manner as described for *Photinus granulatus.*

### (20) **Photinus dimissus** LeConte

*Photinus dimissus* LeConte, 1881, Amer. Ent. Soc., Trans., 9:35.

MALE. Form similar to *P. collustrans,* elytra less elongate, usually not reaching abdominal apex. Pronotum with central subtriangular dark spot, widest in front, not attaining base or apex. Scutellum and mesonotal areas pale fulvous, varying to dusky. Elytra piceous brown, sutural bead flavate, lateral pale border somewhat wider than the very narrow explanate margin, narrowly continuous around apex. Ventral segments 2 to 5 piceous brown, 6 to 9 pale; pygidium dark.

Eyes large, separated medially above by less than diameter of eye. Antennae compressed. Pronotum broadly rounded in front, lateral margins subparallel or feebly converging posteriorly; disk with median longitudinal channel deeply impressed, surface irregularly punctate, punctures sometimes comparatively coarse. Elytra each tapering posteriorly, lateral and sutural margins feebly converging from humerus nearly to apex. Epipleurae obsolete except at base. Ventral segments 6 and 7 large, entirely luminous; apex of pygidium broadly rounded or subtruncate. Aedeagus pale fuscous, similar in structure to figure 15, median lobe broader.

FEMALE. Dissimilar, brachypterous. Pale fulvous above and beneath, pronotal spot and elytra, except margins, somewhat darker. Antennae shorter, second segment more elongate, slightly shorter than third. Eyes small, separated by slightly more than diameter of eye. Elytra small, nearly as long as pronotum, attaining basal third of first abdominal tergite, strongly dehiscent from scutellum. Metacoxae and side pieces of metasternum normal, ventral segment 1 not visible. Ventral segment 6 probably

luminous as usual, but this is not apparent. One example collected at Fedor, Lee County, Texas, V, H. Klages (CM).

LENGTH. Both sexes, 5–7 mm.

DISTRIBUTION. TEXAS. *Uvalde:* VIII–21–14, D. C. Parman (USNM). *Victoria:* IX–10–15, D. C. Mitchell (USNM). *Smetara:* VIII–31–49, L. S. Dillon (CAS). *Denton County:* V–27–34, J. H. Robinson (CAS). *Hockley:* (AMNH). *Florence:* V–30–41, E. L. Thackrey (CAS). *Fedor:* (CU & CM); VI–15–99 (U.Mo); V–20–19, Rev. Brinkman (U.Mo). *Dallas:* VI–15 (Frost); VI–18–06, W. D. Pierce (USNM). *Houston:* V–15–47, (USNM); VI–28–52, H. E. Cott (U.Cal). *Kerrville:* V–30–06, F. C. Pratt (USNM). *Columbus:* V–25, E. A. Schwarz (USNM). *Victoria County:* V–15–11, J. D. Mitchell (USNM). *College Station:* IV–20 to VI–19 (A & M.Tex). *Duval County:* Rialitos, VI–29 (U.Mich). *Gillespie County:* VI-7 to 29 (OSU). *Harris County:* III (Frost). *Temple:* VIII–22–41, H. Dybas (CAS). OKLAHOMA. *Ada:* VII–16–37, Standish-Kaiser (CAS). *Idabel:* VI–30–37, Standish-Kaiser (CAS). *Lebanon:* VII–2–37, Standish-Kaiser (CAS). *Grant:* VII–1–37, Standish-Kaiser (CAS). *Oswalt:* VII–3–37, Standish-Kaiser (CAS). *Comanche County:* Wichita National Forest, VI–11 (U.Mich).

### (21) **Photinus knulli** Green, new species

HOLOTYPE. MALE; Nogales, Arizona, VIII–4–1953, D. J. & J. N. Knull. In collection of Ohio State University.

Form similar to *P. consanguineus.* Pronotum with irregular median

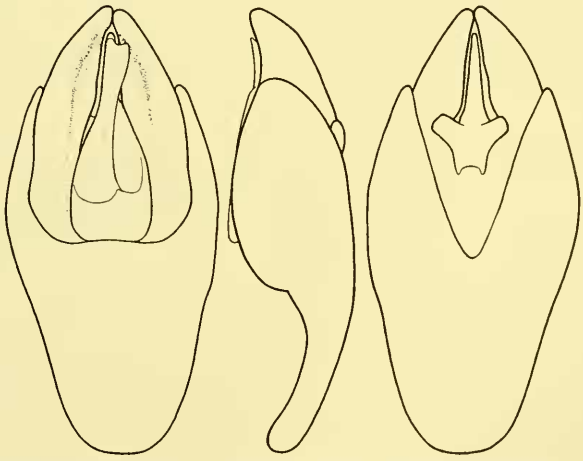

Fig. 16. *Photinus knulli* Green, new species. Holotype; Nogales, Arizona, VIII-4-53, D. J. and J. N. Knull (OSU). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

dark vitta attaining base, diffusing in anterior coarsely punctate area without reaching apex, vitta widest in front, nearly one-third as wide as convex disk, narrowing posteriorly to near base, then expanding; reflexed lateral margin vaguely dusky medially. Scutellum pale piceous, mesonotal areas darker. Elytra piceous black, sutural bead flavate, lateral pale border wider, not exceeding width of explanate margin, narrowly continuous around apex. Ventral segments 2 to 5 black, 6 to 8 pale, 9 dusky; pygidium black.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum minutely and sparsely punctulate, without median impressed line. Epipleurae narrow except at base, attaining abdomen. Ventral segments 6 and 7 large, entirely luminous, apical margin of 8 shallowly arcuately emarginate; apex of pygidium broadly truncate. Aedeagus as in figure 16, flavate, lateral lobes strongly sclerotized, dark brown beneath and at tips. Length 8 mm.

FEMALE. Alate, similar to male. Eyes smaller, separated by more than diameter of eye. Pronotal vitta of nearly uniform width throughout, about one-third as wide as convex disk, reflexed lateral margin not dusky medially. Scutellum and mesonotal areas dark piceous. Ventral surface of abdomen dark piceous, segment 6 pale and luminous in median third or more of width; apex of pygidium narrowly rounded. Length 7.5 mm.

DISTRIBUTION. Arizona. *Nogales:* holotype; 1 female, VIII–2–53, D. J. & J. N. Knull (OSU).

This species differs from all other members of the *P. consanguineus* group by its distinctive male genitalia. It is represented at present only by the male and female above described. Dr. Knull reports that both specimens were taken at light, that no others were seen flying, and that no flashing was noted in either sex. The species is named in honor of Doctor and Mrs. Knull.

### (22) **Photinus indictus** (LeConte)

*Pyropyga indicta* LeConte, 1881, Amer. Ent. Soc., Trans., 9:32.
*Photinus ablucens* Fall, 1927, Brooklyn Ent. Soc. Bull., 22:209 (new synonymy).

MALE. Form similar to *P. consanguineus.* Pronotum with median dark vitta attaining base and sometimes nearly apex, one-third to two-fifths as wide as convex disk, slightly narrowing posteriorly, sometimes abruptly expanding near base. Scutellum and mesonotal areas dark piceous. Elytra piceous black, sutural bead flavate usually to scutellum, lateral pale border wider, slightly exceeding width of explanate margin, continuous around apex, pale borders well defined. Ventral segments dark piceous, segments 6 to 8 often irregularly paler; pygidium with sides and apex broadly pale.

Eyes small, separated medially above by more than diameter of eye. Disk of pronotum finely and sparsely punctulate, median longitudinal line not impressed. Epipleurae narrow except at base. Ventral segments 6 and 7 each subequal in length to segment 5, light organs lacking; pygidium broadly truncate. Aedeagus similar to *P. consanguineus.*

FEMALE. Alate, similar to male. Eyes slightly smaller. Ventral segments uniformly piceous black or brownish, varying with distal segments irregularly more or less pale, light organs lacking; pygidium narrowly rounded at apex.

LENGTH. Both sexes, 6.5–8 mm.

DISTRIBUTION. Ohio. *Newark:* VI–7–99 (OSU). *Ira,* Summit County: VII–15–20, J. S. Hine (OSU). *Delaware County:* VI–2 (OSU). *Amherst:* VII (A & M.Tex). *Toledo:* VI–20 (U.Mich) *Frankfort,* Ross County: VIII–10 (OSM). *Pleasant Run,* Lancaster County: VI–3 (OSM). *Marysville,* Union County: VII–4 (OSM). Michigan. Mt. Clemens: VI–15 to VII–10–34, B. Malkin (CAS). *Midland County:* VI–12 to VII–11–38 (CAS). *Lake County:* VII–20 (Dreisbach). *Lapeer County:* VII–19 (Dreisbach). *Crawford County:* VII–1–39, R. R. Dreisbach (CAS). *Clare County:* VII–23–39, R. R. Dreisbach (CAS). *Wexford County:* VII–3 (Dreisbach). Indiana. *Valparaiso:* VIII–1 (INHS). *Mineral Springs:* VII–4–10, A. B. Wolcott (CNHM). *Hessville:* VII–2–11, W. J. Gerhard (CNHM). *Cromwell:* VI–21–32, H. E. Brown. Illinois. *Lake Forest:* VI–5 & 13 (CU). *Champaign:* VI–23 (INHS). *Evanston:* VI–23–33, J. H. Robinson (CAS). *Algonquin:* V–21 to VII–17 (INHS). *Pulaski:* V–28 (INHS). *Princeton:* VII–2 (INHS). Wisconsin. *Delavan:* Walworth County, VI–18–40, H. Dybas (CNHM). *Waupaca:* VI–6 & 9–1920, L. D. Geniner (USNM). *West Bend:* Washington County, VI–23–06, G. W. Bock (U.Mo). Minnesota. No definite locality (USNM). Tennessee. *Camden:* VIII–9–53, R. X. Schick (UCLA). Georgia. *Atlanta:* VII–2, P. W. Fattig (Em.U); VI–16–47, P. W. Fattig (USNM). Alabama. *Florence:* Wilson Dam, VIII–11–53, R. X. Schick (UCLA). Louisiana. *Opelousas:* IV–17 (OSU). *Baton Rouge:* V–16–34, F. E. Lyman (U.Kans). *Mandeville:* VI–17–17, R. C. Shannon (CU). Texas. *Dayton:* VI–30–18, E. L. Diven (USNM). *Harrison County:* III–25, V–18 (OSU). *Lufkin,* Angelina County: V–9–52, Cazier *et al.* (AMNH). Arkansas. *Hope:* V–28, VIII–5 (CU & Frost); V–6 (CAS). *Washington County:* VII–27 (INHS). Missouri. *Sikeston:* V–12–30, P. H. Johnson (U.Mo). *Columbia:* VII–3–46, W. S. Craig (U.Mo). *Cape Girardeau:* VIII–11–49, W. R. Enns (U.Mo). *St. Louis:* VI–1–1919 (U.Mo). Kansas. *Douglas County:* VII–5–53, P. J. Spangler (U.Mo); F. H. Snow (U.Kans). Nebraska. No definite locality (USNM). South Dakota. *Clear Lake:* VI–27 (SDSC). *Waubay:* VI–22 (SDSC). *Sioux River, Volga:* VI–22 (SDSC). *White:* VII–26 (SDSC). Ontario. *Toronto:* (CAS).

The new synonymy herein proposed was established by an examination of the type series of *Photinus ablucens* in the Fall collection at the Museum of Comparative Zoology. In describing *Pyropyga indicta* LeConte mentioned an example taken by Bolter at Lake Tahoe, California. This is without doubt another instance of mislabeling of the Bolter material.

### (23) **Photinus lineellus** LeConte

*Photinus lineellus* LeConte, 1851, Acad. Nat. Sci. Philadelphia, Proc., (2), 5:335.

MALE. Form narrowly elongate. Pronotum with broad median dark vitta narrowing posteriorly, usually attaining base but not apex. Scutellum and mesonotal areas black. Elytra black, pale sutural and lateral borders uniformly narrow and well defined throughout, continuous around apex. Ventral segments 2 to 5 black, 6 to 8 pale fulvous, 9 dark; pygidium abruptly pale flavate, preceding tergites black.

Eyes large, separated medially above by less than diameter of eye. Pronotum nearly as long as wide, lateral margins subparallel; disk finely and sparsely punctulate, usually with distinctly impressed median longitudinal line. Epipleurae obsolete except at base. Ventral segments 6 and 7 large, entirely luminous; pygidium broadly truncate at apex. Aedeagus similar to *P. consanguineus*.

FEMALE. Alate, similar to male, form broader. Eyes smaller, separated by more than diameter of eye. Ventral surface of abdomen dark piceous, slightly paler apically, segment 6 pale and luminous in median third or more of width, sometimes pale each side, 7 sometimes pale basomedially; pygidium dark, apex rounded or narrowly truncate.

LENGTH. Both sexes, 4.5–6.5 mm.

DISTRIBUTION. Mississippi. *Lucedale:* IV–22–1929, H. Dietrich (CU). Alabama. *Chickasaw:* IV–6 (CU). Florida. *Paradise Key:* Dade County, III–27–54, C. M. Yoshimoto (CU). *Dunedin:* IV–8–26, W. S. Blatchley (CU). *Rockledge:* X–16–54, A. Cruikshank (CAS). *Enterprise:* V–16, Hubbard & Schwarz (USNM). *Lake Placid:* Archbold Biological Station, III–12, V–14 (CU); VII–13–48, E. L. Todd (U.Kans); Archbold Biological Station, I–27 (AMNH). *Homestead:* VII–19–39, P. B. Lawson (U.Kans). *Bradentown:* VIII–6–38, W. Benedict (U.Kans). *Sanford:* VII–28–48, B. T. McDermott (U.Kans). *Stuart:* VI–25–51, O. Bryant (CAS). *Tampa:* IV–10–43, B. Malkin (CAS). *Titusville:* XI–8 (AMNH). *Ormond:* (AMNH). *La Belle:* IV–27 (AMNH) *Everglade:* IV–9 (AMNH). *Capron:* IV–20 (INHS). *New Smyrna:* VI–2, (OSU). *Fort Lauderdale:* V-25 (U. Mich). *Satsuma:* VII–30 (U.Mich). *Orange County:* IX–27–1929, W. M. Loe (USNM). *Lakeland:* V–6, XI–9 (AMNH). *Royal Palm Park:* VII–20–48, E. L. Todd (U.Kans).

This species may be easily recognized by its small size and narrow elongate form, and by the pale pygidium of the male contrasting sharply with the preceding dark tergites. The abruptly pale pygidium is found elsewhere in the Nearctic *Photinus* only in *P. punctulatus,* a larger species with comparatively coarsely punctate pronotum. A male specimen in the National Museum collection, labeled "Sand Hills, Neb., July, L. Bruner," agrees closely with *P. lineellus* in every respect, including the characteristic pale pygidium, except in having the pronotum immaculate. It bears determination label "demissus, 1911, Ern. Olivier." It seems probable that this specimen is a mislabeled example of *P. lineellus.*

### (24) Photinus ignitus Fall

*Photinus ignitus* Fall, 1927, Brooklyn Ent. Soc., Bull., 22:208.

MALE. Form distinctly more elongate than *P. consanguineus,* pronotum narrower, elytra longer. Pronotum with median brownish vitta, rarely darker, attaining base but not apex, sometimes much reduced in size or lacking altogether. Scutellum with tip pale. Elytra dilute brownish piceous, sutural bead flavate, lateral pale border confined nearly to explanate margin. Ventral surface and aedeagus as in *P. consanguineus.*

FEMALE. Form shorter and broader, similar to *P. consanguineus.*

LENGTH. Both sexes, 7–11 mm.

DISTRIBUTION. MAINE, *Monmouth:* VII–16 (Frost). *Eastbrook:* VII–15 (Frost). *Paris:* VII–12 & 19 (Frost). *York Harbor:* VIII–7–39, Henry Field (CNHM). *Rockland:* VII (INHS). NEW HAMPSHIRE. *Durham:* VII–19 (INHS). *Hampton:* VI–24 to VII–31 (EL.Aug). MASSACHUSETTS. *Framingham:* VII–4 & 18 (Frost). *Sherborn:* VI–23 (Frost). *Natick:* VII–15 (Frost). *Southboro:* VI–29 (Frost); VI–13 (CU). *Ware:* VI–26 (Frost). *Marshfield:* VII–5 (INHS). RHODE ISLAND. *Narragansett:* VII–3 (OSU). CONNECTICUT. *Litchfield:* VI–28 (AMNH). *Cornwall:* VI–20 (CU). *Mansfield:* VI–28, VII–7, J. A. Manter (FSPB). *Storrs:* VI–28–20, J. A. Manter (FSPB). NEW YORK. *Ithaca:* VI–4 to VIII–4 (CU). *Elmira:* VI–17 & 21 (CU). *Armonk:* VII–21 (CU). *Minetto:* VI–23 (CU). *McLean Bogs:* VI–23 to VII–3 (CU). *New York:* VI–15 (Malkin). *Flatbush,* L. I.: VI–29 (AMNH). *Taughannock:* VI–27 (OSU). *New Rochelle:* VIII–7 to 15 (AMNH). *Bear Mountain:* VI–29–47, B. L. Ladner (U.Cal). *Islip,* L. I.: VII–3–48, J. G. Rozen (U.Cal). PENNSYLVANIA. *Easton:* VI–11 to VII–19, J. W. Green (CAS). *Wind Gap:* VI–20 to VII–26, J. W. Green (CAS). *Pocono Lake:* VI–11, J. W. Green (CAS). *Columbia Crossroads:* VII–14 (UO). *Hummelstown:* VII–15 (OSU). *Rickets,* North Mountain: VII–10, H. W. Wenzel (OSU). NEW JERSEY. *Phillipsburg:* VI–24, J. W. Green (CAS). *New Brunswick:* VII–12 (AMNH). *Ramsey:* VII–9 (AMNH).

*Anglesea:* VIII–4 (OSU). *Atsion:* VI–27–46, J. W. Green (CAS). Delaware. *Middletown:* VI–24–51 (U.Del). Virginia. No definite locality (INHS). North Carolina. *Gibsonville:* VI–3 (CU). *Raleigh:* VI–11 to VII–13 (NCDA).

The distinguishing characters of the species of *Photinus* are all more or less subject to variation, and specimens of the *ignitus-consanguineus* type will be found that cannot be allocated confidently to one or the other of these species. There is not, however, any doubt concerning the specific validity of *P. ignitus*.

### (25) **Photinus consanguineus** LeConte

Photinus consanguineus LeConte, 1851, Acad. Nat. Sci, Philadelphia, Proc., (2), 5:335.
*Photinus vittiger* LeConte, same as above, page 336.
*Photinus zonatus* Gemminger, 1870, Col. Hefte, 6:120.

MALE. Form as shown in figure 19. Pronotum with median dark vitta about two-fifths as wide as convex disk, slightly narrowing posteriorly, attaining base but not apex, diffusely entering anterior coarsely punctate area; convex surface each side flavate or rosy. Scutellum and mesonotal areas dark piceous. Elytra piceous black or brown, sutural bead flavate, lateral pale border wider, exceeding width of explanate margin medially, its inner limit usually well defined, rather broadly continuous around apex. Ventral segments 2 to 5 black, 6 and 7 pale, 8 and 9 infuscate; pygidium black.

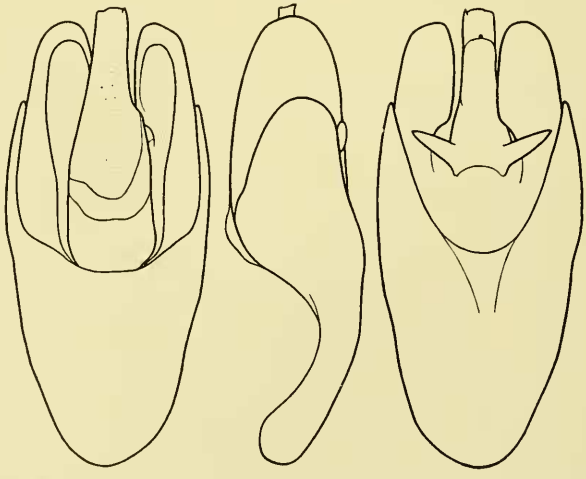

Fig. 17. *Photinus consanguineus* LeConte. Easton, Pennsylvania, VI–24–34, J. W. Green (CAS). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

Eyes large, separated medially above by less than diameter of eye. Disk of pronotum finely and moderately closely punctulate, punctures spaced by two to five times their diameters; median longitudinal line usually not impressed. Epipleurae distinct, attaining middle of abdomen. Ventral segments 6 and 7 large, entirely luminous; pygidium broadly truncate. Aedeagus as in figure 17, ventrobasal processes varying to apices truncate.

FEMALE. Alate, similar to male, not differing appreciably in form. Eyes smaller, separated by more than diameter of eye. Ventral segment 6 pale and luminous in median third or more of width, usually pale, or partially so, each side; segments 7 and 8 brownish fuscous, somewhat mottled, varying to nearly black, segment 7 lacking the pale subapical maculation usually occurring in females of the *P. ardens* group; pygidium narrowly rounded at apex.

LENGTH. Both sexes, 7.5–11 mm.

DISTRIBUTION. MASSACHUSETTS. *Woods Hole:* VII (AMNH). *Marthas Vineyard:* VII–17–47, F. M. Jones (CAS). CONNECTICUT. *Litchfield:* VII–20 (AMNH). NEW YORK. *Bear Mountain:* VI–25 to VIII–6 (AMNH). *New York:* VI–10 to VIII–3 (AMNH & Malkin). *Montauk,* L. I.: VI–30 (CU). *Flatbush,* L. I.: VI–19 to VII–10 (AMNH). *Riverhead,* L. I.: VI–23 (CU). PENNSYLVANIA. *Easton:* VI–24 to VII–19, J. W. Green (CAS). *Wind Gap:* VII–6–46, J. W. Green (CAS). *Pittsburgh:* VI–20–42, C. O. St. John (CAS). NEW JERSEY. *Phillipsburg:* VI–24, J. W. Green (CAS). *Lakehurst:* VII–4 (CAS). *Atlantic City:* (INHS). *Browns Mills:* VI–10 (AMNH). *Alpine,* Bergen County: VI–24 & VII–9–48, J. G. Rozen (U.Cal). DELAWARE. *Milford:* VI–2–53, H. E. Milliron (U.Del). *Wilmington:* VI–23–48, F. A. McDermott (CAS). MARYLAND. *Odenton:* VI–15 & 23 (CU). *Plummers Island:* VI–7 (INHS). DISTRICT OF COLUMBIA. *Chevy Chase:* VI–12–30, H. S. Barber (USNM). WEST VIRGINIA. *Sistersville:* VI–16–30 (CAS). TENNESSEE. *Great Smoky Mountains National Park:* VI–10 (Dreisbach). *Gatlinburg:* VI–25–28, R. H. Whittaker. NORTH CAROLINA. *Raleigh:* VI–18 to VII–7 (NCDA). *Southern Pines:* V–13–1918, A. H. Manee (USNM). *Montreat:* VII–9 (INHS). *Maxton:* IX–17 (AMNH). *Black Mountains:* VI–20 to VII–14 (AMNH). SOUTH CAROLINA. *Oconee County:* VI–19–40, O. L. Cartwright (CAS). GEORGIA. *Roberta:* V–16–41, P. W. Fattig (USNM). *Okefenokee Swamp:* VII–30–34, M. E. Griffith (USNM). *Waycross:* IV–21–38, W. J. Gertsch (CAS). *Atlanta:* V–28, P. W. Fattig (Em.U). *Lakemont:* VI–5, P. W. Fattig (Em.U). FLORIDA. *St. Augustine:* IV–18 (Frost). *Dunedin:* II–25. (CU). *Alachua County:* III–30–54, H. V. Weems, Jr. (FSPB). *Crescent City:* IV–23 (AMNH). *Enterprise:* X–5 (AMNH). MISSISSIPPI. *Lucedale:* IV-21 (CU). OHIO. *Scioto County:* VI–10 & 17 (OSU). INDIANA. *Beverly Shrs.,* Porter County: VII–2–39, H. Dybas (CNHM). TEXAS. *Karnack:* V–22 (OSU).

This species forms with *P. ignitus* a complex that cannot at present be satisfactorily resolved. Typical examples of both *P. consanguineus* and *P. ignitus* are easily recognizable by the characters given in couplet 25 of the key. There are, however, no positive characters known by which nonconforming specimens may be definitely placed. The occasional occurrence of such specimens indicates, perhaps, that one of more additional species are involved. The most confusing of these are darkly pigmented individuals, apparently belonging to *P. consanguineus,* but with the lateral pale border of the elytra narrow and confined to the explanate margin. A number of undersized examples, some as small as 6 mm. in length, have been noted from the South Atlantic States. It is quite likely that among these a valid species might be segregated. Two specimens in the Chicago Natural History Museum collection, from Illinois and Indiana, closely resemble *P. ardens* in appearance, having the form elongate, the pronotum with obscure lateral maculation, and the elytra with very narrow pale borders.

(26) **Photinus consimilis** Green, new species

HOLOTYPE. MALE; Roaring River State Park, Missouri, VI–15–54, J. W. Green. In collection of California Academy of Sciences.

Form similar to *P. pyralis,* less elongate. Pronotum with well defined median dark vitta attaining base, terminating diffusely at anterior coarsely punctate area, about two-fifths as wide as convex disk, slightly broader in front; convex surface each side fulvous, without trace of obscure maculation. Scutellum and mesonotal areas dark piceous. Elytra dark piceous, sutural

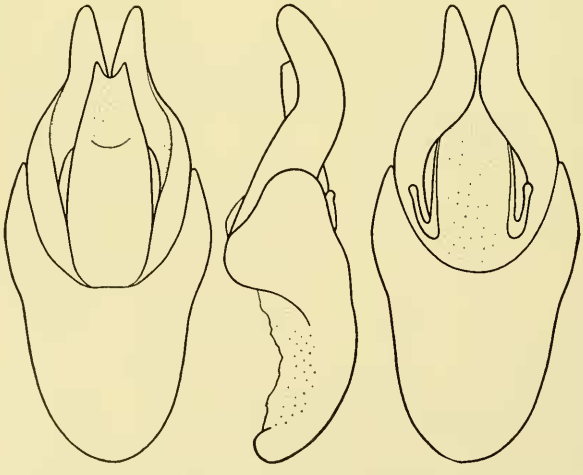

Fig. 18. *Photinus consimilis* Green, new species. Paratype; Hope, Arkansas, IX–10–31 (CAS). Male genitalia: dorsal, lateral, and ventral views, arranged in that order from left to right.

bead flavate, lateral pale border wider except at humerus, exceeding width of explanate margin, rather broadly continuous around apex. Ventral segments 2 to 5 piceous black, 6 and 7 pale flavate, 8 dusky, 9 darkly piceous; pygidium dark.

Eyes large, separated medially above by less than diameter of eye. Pronotum longer as compared to *P. ardens,* anterior margin more narrowly rounded at middle, lateral margins arcuate, slightly converging at hind angles; disk finely and moderately closely punctulate, median impressed line lacking. Epipleurae narrow except at base, attaining middle of abdomen. Ventral segments 6 and 7 large, entirely luminous, 8 not emarginate, middle of its apical margin produced in a short subtriangular cusp extending posteriorly and slightly downward; apex of pygidium rather narrowly rounded. Aedeagus as in figure 18. Length 11.25 mm.

FEMALE. Alate, similar to male, not differing in shape. Eyes smaller, separated by more than diameter of eye. Ventral segment 6 pale and luminous in median third or more of width, pale each side except broadly at basal exterior angles, 7 and 8 entirely dark, varying with 7 maculate with pale spots along apical border, these often confluent so that apical half of segment is pale, the pale area sometimes extending to base medially.

VARIATIONS. The color of the elytra varies from dark piceous to a very dilute brown. The pale elytral borders are usually distinct, but in the palest specimens may blend imperceptibly with the central area. In the pale specimens a darker brown streak may extend backward from the humerus, producing a vaguely vittate effect. In the darker specimens the outer oblique costa of the elytra may be narrowly pale throughout. Rarely the lateral pale border of the elytra is narrower, scarcely exceeding the explanate margin in width. The median vitta of the pronotum may not quite attain base, and may extend diffusely into the anterior coarsely punctate area. Ventral segment 8 of the male varies from entirely pale to entirely dark, and its apical cusp may be reduced to a blunt projection. The outline of the pronotum (figure 19) varies considerably, as in all Lampyridae, and does not constitute an infallible diagnostic character. Length 8–15 mm.

DISTRIBUTION. Pennsylvania. *Tannersville:* 1 female, VII–8–47, J. W. Green (CAS). Ohio. *Millersburg:* 1 paratype, VI–18–31, R. P. Thomas (CAS). Michigan. *Livingston County,* George Reserve: 1 paratype, 1 female, VII–1–33, S. Moore (Dreisbach); 1 female, VII–1–33, S. Moore (CAS); 2 paratypes, VII–10–32, A. W. Andrews (Dreisbach); 2 females, VI–12 & 26–32, A. W. Andrews (Dreisbach); 1 paratype, VII–16–32 (CAS). *Southfield,* Oakland County: 1 paratype, VII–4–31, S. Moore (Dreisbach). *Port Huron:* 1 paratype, VI, Hubbard & Schwarz (USNM). *Pentwater:* 1 paratype, VII–35, H. Dybas (CNHM). No definite locality: 1 paratype, E. Chope (CNHM). Indiana. *Tremont:* 1 female, VI–26–43, A. K. Wyatt

(CNHM). *Mineral Springs:* 1 female, VII–3–11, F. Psota (CNHM). Illinois. *Chicago:* 1 paratype, VI–28–06, W. J. Gerhard (CNHM); 1 paratype, VI–30–96, J. E. McDade (USNM). *Putnam County:* 1 paratype, VI–17–32, M. C. Glenn (CAS). *Oakwood:* 1 paratype, V–30-32, Coll. Frison (INHS). *Kampville:* 1 paratype, VI–25–31, Frison, et al. (INHS). New Jersey. *Orange:* 1 paratype, VI–20 (USNM). Maryland. *Lanham:* 21 paratypes, 1 female, VII–7 & 14–26, H. S. Barber (USNM); 4 paratypes, same data (CAS); 1 paratype, VIII–30–26, H. S. Barber (USNM). *Breton Bay:* 2 paratypes, VII–12–24, H. S. Barber (USNM). *Hills Bridge,* Patuxent River: 2 paratypes, VI–26–24, H. S. Barber (USNM). *Plummers Island:* 1 female, VII–17–24, H. S. Barber (USNM). District of Columbia. Washington: 4 paratypes, 1 female, Shaw Lily Ponds, V–22 & 31–1929, VII–8–1926, H. S. Barber (USNM); 38 paratypes, M Street Marsh, VII–17 & 18–1927, H. S. Barber (USNM). *North River,* 22 mi. ENE. of Washington, 4 paratypes, VI–12–28, H. S. Barber & P. G. Russell (USNM). Virginia. Mouth of *Difficult Run:* 1 female, VI–18–30, H. S. Barber (USNM). North Carolina. *Black Mountains:* 1 female, VII–7–12, Beutenmuller (CAS). South Carolina. *Loris:* 1 paratype, V–20–40, B. M. Heniford (CAS). Georgia. *Cartersville:* 1 female, VI–14–40, P. W. Fattig (CAS). *Atlanta:* 1 paratype, VI–4–39, P. W. Fattig (CAS). Alabama. *Tuscaloosa:* 1 paratype, 1 female, VI–10–52; B. D. Valentine (CAS). *Mobile:* 1 paratype, VI–5–25, C. E. White (INHS). Florida. *Levy County:* 1 paratype, IV–3–54, H. V. Weems, Jr. (FSPB). *Lakeland:* 1 paratype, 1 female, III–16–48, R. F. Hussey (CAS). *Stuart:* 1 paratype, VI–25–51, O. Bryant (CAS). *Lacoochee:* 1 female, VIII–18–30, J. Nottingham (U.Kans). *Sebring:* 1 paratype, VI–20–51, Price, Beamer, Weed (U.Kans); 1 paratype, 1 female, III–7 to 12–1939, F. E. Lutz (AMNH). *Royal Palm Park:* 1 paratype, VII–20–48, E. L. Todd (U.Kans). *Highland Hammock,* near Sebring: 1 paratype, 1 female, III–24, Gertsch (AMNH). *Lake Placid:* 2 paratypes, I–27–43 & II–5–43, M. Cazier (AMNH); 2 females, I–23–43, M. Cazier (AMNH); 1 paratype, V–8–47, and 1 female, III–6–45, Archbold Biological Station, J. G. Needham (CU). *Lake Worth:* 1 paratype, Coll. Mrs. A. T. Slosson (AMNH); 1 paratype (CU). *Everglade:* 1 female, IV–9–1912 (AMNH). *Biscayne Bay:* 1 paratype, Mrs. A. T. Slosson (AMNH). *F. Capron:* 1 male, III–4 (MCZ–LeConte collection); 1 paratype, IV–12, Hubbard & Schwarz (CAS). *Edgewater:* 1 paratype, 1 female, III–12 & 13–1939 (Frost). *Gainesville:* 1 female, IV–25–25, T. H. Hubbell (U.Fla). *Alachua County:* 1 female, VIII–27–54, H. V. Weems, Jr. (Frost). *Belleglade:* 1 paratype, 1 female, VI–2–27, M. D. Leonard (CU). *Enterprise:* 2 paratypes, 2 females, VI–13 to 24, Hubbard & Schwarz (USNM); 1 paratype, same data (CAS). *Paradise Key:* 6 paratypes, 1 male, 4 females, II–19 to III–4–1919, H. S. Barber (USNM). *Brevard County:* 1 paratype, III–18–30, J. Howard (USNM). *Crescent City:* 1 paratype, Hubbard & Schwarz

(USNM). *Dunellen:* 1 paratype, VII–12–30 (USNM). *Sanibel Island:* 1 female, IV–26–27, M. D. Leonard (CU). *Winter Park:* 1 paratype, VI–10–44, H. T. Fernald (Frost); 2 females, VI–5 & 8–45, H. T. Fernald (Frost). LOUISIANA. *Harahan,* Jefferson Parish: 3 paratypes, 5 females, VII–26 to VIII–24–44, H. Dybas (CNHM). *Crowley:* 1 paratype, VII–29–10, C. E. Hood (USNM). *Gueydan:* 2 paratypes, V–28 & VII–21–1925, E. Kalmbach (USNM). No definite locality: 1 female (U.Mo). MISSOURI. *Roaring River State Park:* holotype, 6 paratypes, 5 females, VI–15–54, J. W. Green (CAS); 1 paratype, same data (Frost). ARKANSAS. *Prairie County:* 1 male, VII–1–26, T. E. White (U.Kans) *Hope:* 2 paratypes, 1 female, IX–10–31, coll. Mank (CU); 1 paratype, same data (CAS). OKLAHOMA. *Eagletown:* 1 paratype, VI–28–37, Standish-Kaiser (CAS). *Sherwood:* 1 paratype, VI–27–37, Standish-Kaiser (CAS). CANADA. No definite locality: 1 paratype, coll. J. B. Smith (USNM).

In general appearance this species rather closely resembles *P. consanguineus,* with which it has heretofore usually been confused. In the LeConte collection *P. punctulatus* number 2 and *P. consanguineus* numbers 10 and 11 are examples of *P. consimilis.* The pale form of *P. consimilis* predominates in Florida, and has been noted from Louisiana and Arkansas. Mixed series, of pale and dark individuals, from the same locality precludes any subspecific segregation.

### (27) **Photinus carolinus** Green, new species

HOLOTYPE. MALE; Mt. Mitchell, North Carolina, 6711 ft., VI–24–37, Hans L. Stecher. In collection of California Academy of Sciences.

Form similar to *P. consanguineus,* less elongate than *P. ardens.* Pronotum with well defined median dark vitta attaining base, not entering

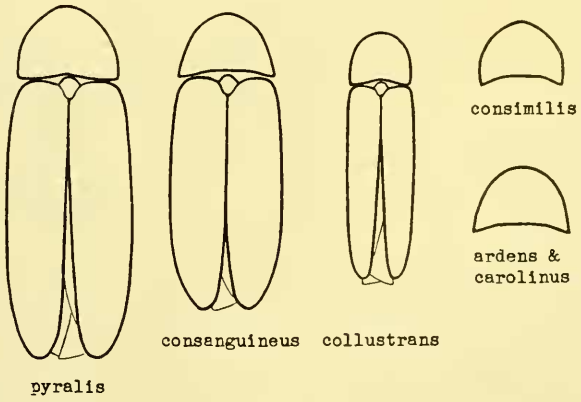


Fig. 19. Body outlines of *Photinus pyralis, P. consanguineus,* and *P. collustrans,* and pronotum outlines of *P. consimilis, P. ardens,* and *P. carolinus.*

coarsely punctate anterior area, of nearly uniform width throughout, almost half as wide as convex disk; pale area each side rosy, not obscured by darker maculation. Scutellum and mesonotal areas dark piceous. Elytra piceous black, sutural bead pale fulvous, lateral pale border scarcely wider, confined to explanate margin, narrowly continuous around apex. Ventral segments 2 to 5 piceous black, 6 to 8 pale, 9 dusky; pygidium piceous black.

Eyes large, separated medially above by less than diameter of eye. Pronotum as in *P. ardens,* broadly rounded in front, lateral margins feebly diverging to hind angles (figure 19); disk finely punctulate, punctures spaced by about four times their diameters, median impressed line obliterated. Epipleurae narrow except at base, attaining middle of abdomen. Ventral segments 6 and 7 large, entirely luminous; segment 8 scarcely emarginate, middle of its apical margin with triangular cusp extending posteriorly and somewhat downward; apex of pygidium narrowly rounded. Aedeagus similar to *P. consimilis.* Length 11.5 mm.

FEMALE. Alate, similar to male, less elongate, elytra relatively shorter. Eyes smaller, separated by more than diameter of eye. Ventral segment 6 pale and luminous in median third or more of width, sometimes more or less pale each side, 7 usually with two small submedian pale spots near apical border, these sometimes lacking.

VARIATIONS. The pronotal vitta may be broadest in front, narrowing slightly toward base, rarely diffusely entering anterior coarsely punctate area. The outline of the pronotum is inconstant and specimens occur with the anterior margin more narrowly rounded medially, or with the lateral margins subparallel, but rarely are they feebly converging at the hind angles. The pale parts of the pronotal disk may be flavate instead of rosy. Ventral segment 8 of the male varies from entirely pale to partly or entirely piceous. In one male example, tentatively associated, the elytra are entirely piceous black. Length 8–12.5 mm.

DISTRIBUTION. Virginia. *Shenandoah Park:* 1 paratype, 1 female, VII–12–52, Dr. Buck (CAS). *Pocosin,* 5 miles north of Swift Run Gap: 22 paratypes, VII–4–47, H. S. Barber (USNM), 2 paratypes, same data (CAS). West Virginia. *Brush Creek* mouth: 1 paratype, VII–18–30, J. G. Needham (CU). North Carolina. *Mt. Mitchell:* 6711 ft., holotype, 2 paratypes, 1 female, VI–24–37, Hans L. Stecher coll. (CAS). *Sunburst:* 1 male, 1 female, VI–7–39, O. L. Cartwright (CAS). *Cherokee:* 1 paratype, VI–28–88 (CAS). *Montreat:* 2 paratypes, VII–14–28 (CAS). *Black Mountains:* Van Dyke coll., 3 paratypes, 4 females, VII–02 (CAS); 1 paratype, VII–02 (Frost); 1 paratype, VI–02 (CAS); 1 female, VI–24 (AMNH). *Graybeard Mountain:* 1 paratype, 1 female, VI-19 & VI–7 (AMNH). *Cranberry:* 2 paratypes, VI–13, VI–15, H. W. Wenzel (OSU). Tennessee. *Johnson City:* 1 female, 2–4000 ft., VI–12–51, O. Bryant (CAS). *Great Smoky*

*Mountain National Park:* 4 paratypes, 3 females, Chimney Camp, VI–14–47, H. Dietrich (CU); 1 female, Greenbrier Cove, VI–19–42, H. Dybas (CNHM); 1 paratype, Chimney Camp, VI–12–54, H. E. & M. A. Evans (CU).

This species is an Appalachian offshoot of the more northern *P. ardens,* from which it differs in its broader form, generally darker pigmentation, and better defined pronotal vitta, the disk each side clear fulvous or flavate and unobscured by darker maculation.

### (28) **Photinus ardens** LeConte

*Photinus ardens* LeConte, 1851, Acad. Nat. Sci. Philadelphia, Proc., (2), 5:334.
*Photinus taedifer* LeConte, same as above.
*Photinus obscurellus* LeConte, same as above, page 335.
*Photinus frigidus* E. Olivier, 1888, Soc. Ent. France, Ann., (6), 8:54. (new synonymy)

MALE. Form similar to *P. pyralis,* somewhat more elongate. Pronotum with poorly defined median dark vitta attaining base but not apex, about half as wide as convex disk, pale area each side more or less obscured by nubilous brownish or piceous spots, rarely completely obscured; coarsely punctate borders dusky flavate. Scutellum and mesonotal areas dark piceous. Elytra dark brownish piceous, varying to pale brownish gray, sutural bead flavate, usually indistinctly so near scutellum, lateral pale border wider, confined to explanate margin, more broadly continuous around apex. Ventral segments 2 to 5 dark piceous, 6 to 8 pale, 9 dusky, pygidium dark.

Eyes large, separated medially above by less than diameter of eye. Pronotum usually with anterior margin regularly and broadly arcuate, lateral margins subparallel or feebly diverging posteriorly, usually not at all converging at hind angles (figure 19); disk finely and moderately closely punctulate, punctures spaced by two to four times their diameters, median longitudinal line obliterated. Epipleurae narrow except at base, attaining middle of abdomen. Ventral segments 6 and 7 large, entirely luminous, 8 not or very feebly emarginate, middle of its apical margin with short variable cusp, obtuse or acute; pygidium narrowly rounded at apex. Aedeagus similar to *P. consimilis.*

FEMALE. Alate, similar to male, form broader, elytra relatively shorter. Eyes smaller, separated by more than diameter of eye. Ventral segment 6 pale and luminous in median third or more of width, usually pale each side except more or less broadly at basal exterior angles, 7 entirely dark, or variably maculate with nubilously defined pale areas, these usually confined to apical half of segment.

LENGTH. Both sexes, 7–12.5 mm.

DISTRIBUTION. Maine. *Augusta:* VI–24–53, A. H. Brower (Frost). *E. Machias:* VI (CAS). *Paris:* VII–13–49, C. A. Frost (CAS). *Knox County:* VI-20-50 (OSU). New Hampshire. Franconia: (CU). *Colbrook:* VII–21 (AMNH). *Manchester:* (INHS). *Durham:* VI–26 (INHS). *Hampton:* VI–26 (EL.Aug). Massachusetts. *Ayer:* VII–2–24, H. S. Barber (USNM). *Monterey:* VII–19–39, E. A. Chapin (USNM). *Framingham:* VI–21 to VII–18 (Frost). *Sherborn:* VI–22 (Frost). *Natick:* VI–6 (Frost). *Chatham:* VII–14 (Frost). *Berlin:* VI–13 (Frost). *Forest Hills:* VII–4–15, F. X. Williams (CAS). *Worcester:* (CAS). Connecticut. *Cornwall:* VI–8 & 12 (CU). *Storrs:* VI–26–20, J. A. Manter (Frost). New York. *Ithaca:* VI–17 (CU); VII–17, Ringwood (CU). *Paul Smiths:* VI–19–25 (CU & CAS). *Fulton:* VI–20 (CU). *McLean Bogs,* Thomkins County: V–30 & VII–9 (CU). *Buffalo:* VI–25–09 (CAS). *Peterboro:* VI–17–28, G. S. Miller (USNM). Pennsylvania. *Milford:* Pike County, VI–1–41 (Malkin). *Belfast:* V–27–37, J. W. Green (CAS). *Columbia X-roads:* VIII–4 & 27–37, R. M. Leonard (CAS). New Jersey. *Ramsey:* VII–6 (AMNH). Maryland. *Baltimore:* VI–20–09, F. E. Blaisdell (CAS). West Virginia. *Sistersville:* VI–16–30 (CAS). Ohio. *Millersburg:* VI–18–31, R. P. Thomas (CAS). Michigan. *Marquette:* VI–28 (CAS). *Horn Mountain Club:* VI (CAS). *St. Joseph County:* V–30–41, R. R. Dreisbach (CAS). Indiana. *Hessville:* V–27–11, W. J. Gerhard (CNHM). Illinois. *Chicago:* VI–23–09, W. J. Gerhard (CNHM). *Algonquin:* (INHS). Wisconsin. *Bayfield:* Wickham (CAS). Minnesota. *Duluth:* (CAS & SDSC). South Dakota. *Volga:* (SDSC). Newfoundland. "Terre Neuve," Ern. Olivier (USNM). Nova Scotia. *Baddeck:* VII–26–27 (USNM); VI–19–31, G. Fairchild (USNM). Quebec. *Duparquet:* VII–1–41, G. Stace Smith (CAS). *Aylmer:* VI–23–36, G. Stace Smith (CAS). Ontario. *Toronto:* (CAS). *Prince Edward County:* VI–18 (Frost); VI–22 (McClay).

Specimens in the United States National Museum collection, labeled "Terre Neuve," "*Photinus frigidus* Ern. Oliv.," and "Specimen typicum originale auctoris, Ern. Olivier," undoubtedly belong to *P. ardens* and constitute the basis for the synonymy above proposed.

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